# WESTERN GAS

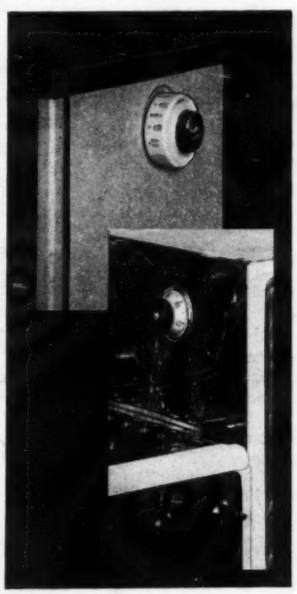
July 1931

20 Cents the Copy

betters the performance
of any gas range . . .

THERMOLATOR

the oven heat control
with every advantage



- in principle
- in design
- in construction
- in appearance
- in installation
- in operation
- in saleability

WRITE FOR COMPLETE DETAILS

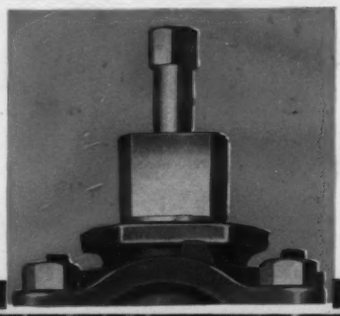
MILWAUKEE GAS SPECIALTY CO.

MILWAUKEE

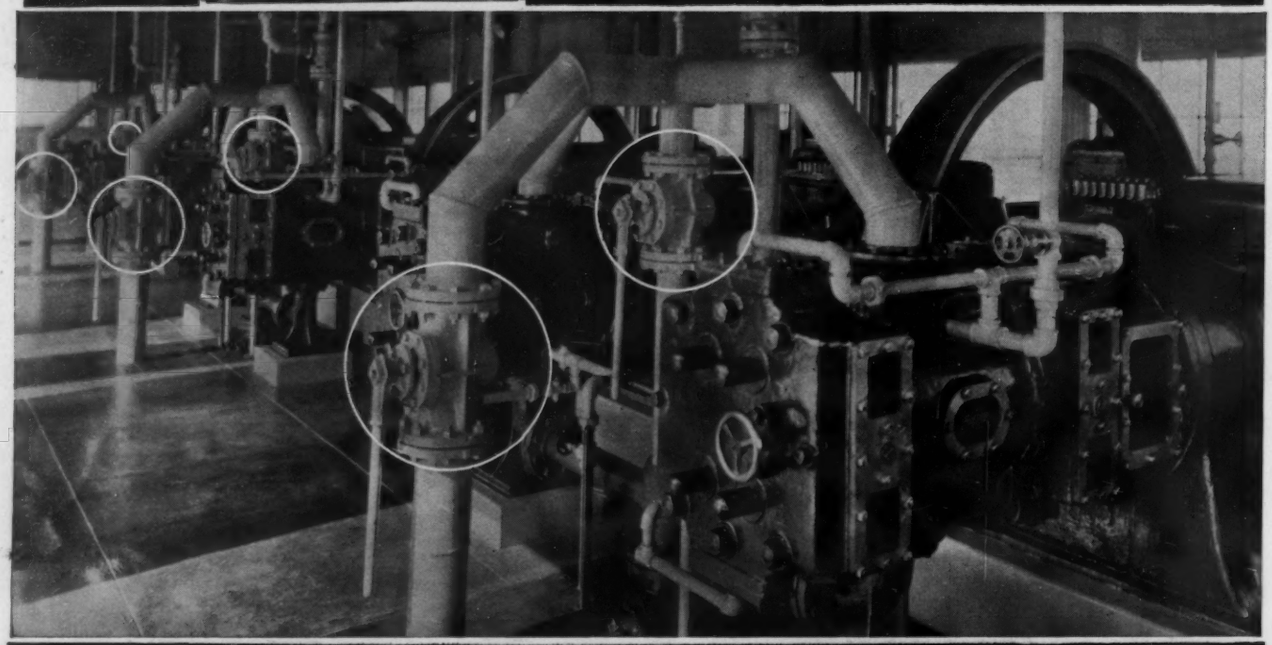
A MONTHLY JOURNAL DEVOTED TO THE WESTERN GAS & APPLIANCE INDUSTRIES

TP700
.P3

The Perfect Application of a Principle

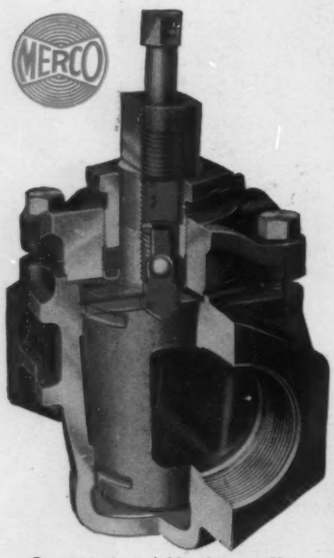


# *This* screw controls a multitude of VALVE PROBLEMS



Nordstrom Valves on discharge and intake manifolds in a gas company compressor plant.

## Turn down the screw to lift the plug




*Cut-away view of Nordstrom Valve showing patented "Sealdport" method of lubrication which resists leaks. The most satisfactory solution of your valve problems.*

Turn down the screw of a Nordstrom Valve and you have stopped your valve troubles. For this simple operation works wonders! The plug is lifted by hydraulic pressure, thus separating the seating surfaces so that a uniform distribution of special "Merco" lubricant is obtained. Once distributed, the lubricant makes the valve leak-resistant, easy to turn and protects the metal surfaces against wear.

Tell us your valve troubles and we'll show you how they can be corrected. In the meantime, just say "Send me your latest Catalog."

# NORDSTROM VALVES

**MERCO NORDSTROM VALVE COMPANY**

SUBSIDIARY OF THE MERRILL COMPANY . . ENGINEERS

**Atlanta** - Healey Bldg.
**Boston** - 250 Stuart St.
**Buffalo** - 1.W. Genesee St.
**Charleston** - W. Virginia
**Chicago** - 176 W. Adams St.
**Dallas** - Magnolia Bldg.
**Detroit** - 2842 West Grand Blvd.
**El Paso** - 111 So. Virginia St.
**Houston** - Petroleum Bldg.
**Los Angeles** - 1709 West 8th St.
**New Orleans** - Masonic Bldg.
**New York** - 11 W. 42nd St.
**Pittsburgh** - Clark Bldg.
**St. Louis** - 317 N. Eleventh St.
**San Francisco** - 343 Sansome St.

**Agencies:**

**Denver** - Republic Supply Company 332 Continental Oil Bldg.
**Honolulu** - W. A. Ramsay Co., Ltd., Fort & Queen Streets
**Philadelphia** - Brown, Wilson & Company, 1600 Arch St.
**Saginaw** - Arthur C. Beckert, 112 Durand St.
**Salt Lake City** - National Equipment Co., 101 West 2nd South St.
**Tulsa** - B.V. Emery & Company, 216 E. Brady Street

**Factory** - Oakland, Calif.

**Canada** - Peacock Bros., Ltd., Montreal, Toronto, Winnipeg, Vancouver. (Also Sydney, N.S.)
**England** - Audley Engineering Co., Ltd., Newport, Shropshire.
**Buenos Aires, Argentine,** - General Electric, Soc. Anon., Victoria 618 Esq. Peru.

*Nordstrom 500-pound Cast Steel Valve. "Sealdport" lubrication makes this valve leak-resistant.*

*Nordstrom "Venturi" Valve. Advantages include "Sealdport" lubrication, leak-resistance, easy operation — compactness.*

*Nordstrom 1500-pound Valve with patented "Sealdport" method of pressure lubrication.*

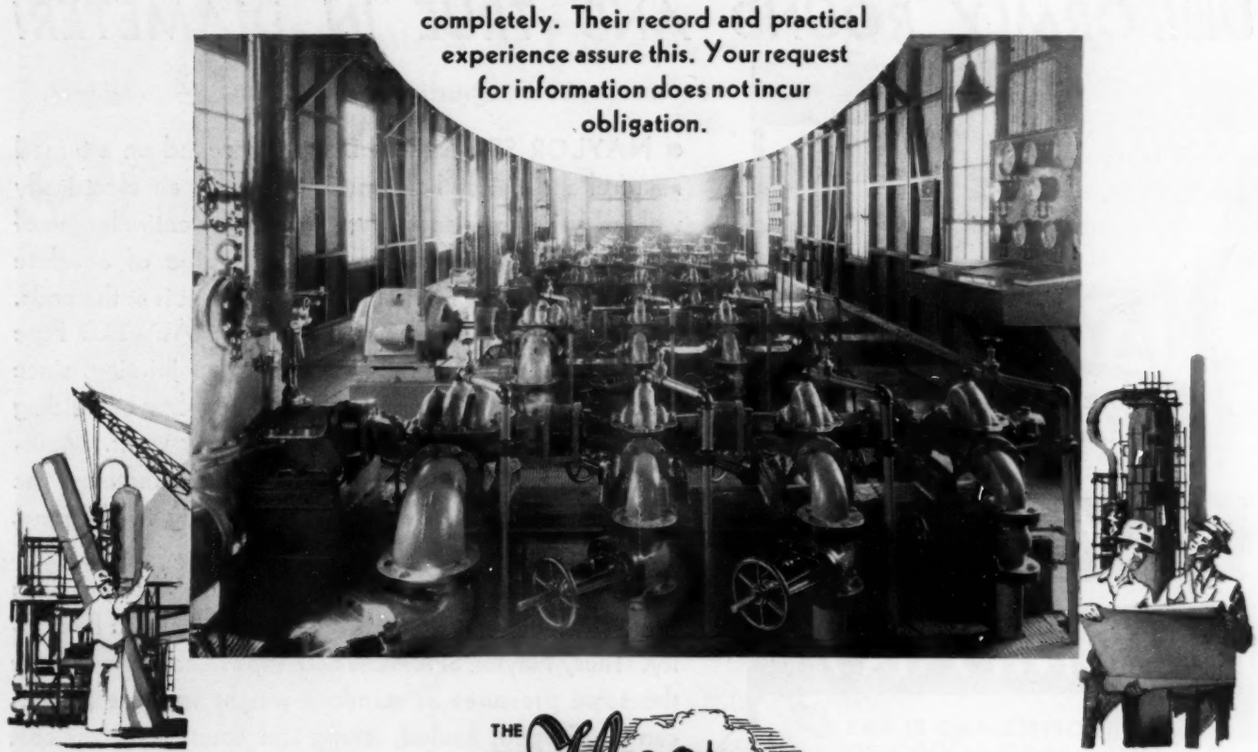
M.E. 25/IX/36

# An extremely long pump string— — installed by FLUOR engineers

Here is an installation which required unusual engineering skill. Consider the exactness, the accuracy involved in lining up such a long pump string. FLUOR engineers handled this job. It is a concrete example of their scope and ability. ¶ Notice that the four pumps on the first shaft are steam turbine powered; the four on the second shaft are electric turbine powered. Another feature of this installation: absorption oil, still reflux and water are being pumped on same shaft. ¶ Whatever your plant or installation problem, undoubtedly FLUOR engineers can assist you completely. Their record and practical experience assure this. Your request for information does not incur obligation.

Complete service on: Absorption Plants, Compressor Stations, Refinery Equipment, Cooling Towers, Cooling Systems, Boiler Plants, Pump Stations, Machinery installation, General construction. ❖ ❖

Here is an interior view of a gasoline absorption plant at Elwood, California. All working units were installed and co-ordinated by Fluor Corporation, Ltd. ❖ ❖ ❖ ❖



THE FLUOR CORPORATION, LTD.

909 East 59th Street, Los Angeles

TULSA, OKLAHOMA — 11 East Fifth Avenue

NEW YORK, N. Y. — 30 Church Street

DALLAS, TEXAS — Magnolia Bldg.

KANSAS CITY, MO. — 503 Fairfax Bldg.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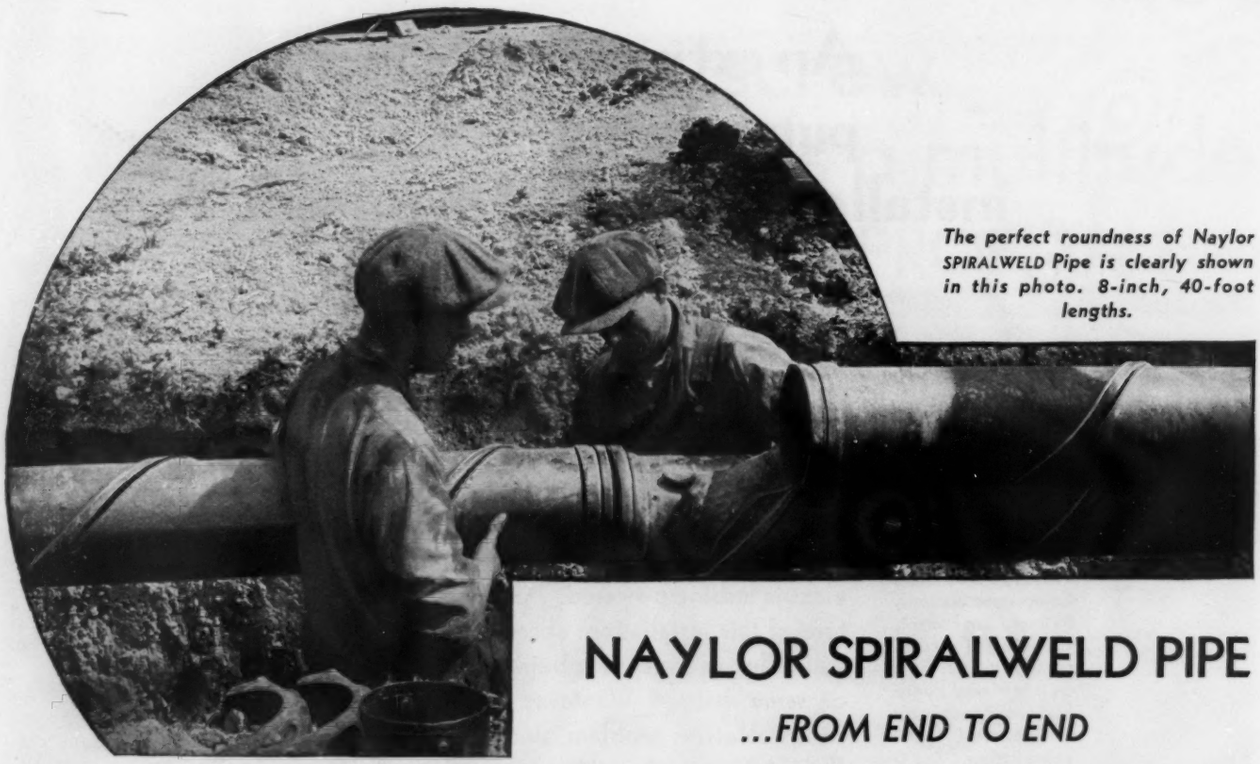
M.L. 25/IX/36



*The perfect roundness of Naylor SPIRALWELD Pipe is clearly shown in this photo. 8-inch, 40-foot lengths.*

# NAYLOR SPIRALWELD PIPE

## ...FROM END TO END

## UNIFORMLY ROUND AND TRUE IN DIAMETER!

TRADE MARK

NAYLORPIPE

PIPE CARRIED IN STOCK AT CHICAGO, HOUSTON AND LOS ANGELES

**NAYLOR PIPE COMPANY**

MAIN OFFICE AND PLANT
1230 East 92nd Street, CHICAGO

SALES OFFICES

NEW YORK
3116 Chrysler Building

PHILADELPHIA
Witherspoon Building

TULSA
507 Philtower Building

HOUSTON
2301 Commerce Street

FT. WORTH: 402 Petroleum Building

LOS ANGELES: Champion & Barber, Inc., 576 Subway Terminal Building., Exclusive Distributors: California, Nevada and Arizona

MONTREAL, CANADA: Mechanical Equipment Company, 660 St. Catherine St., West

VANCOUVER, B. C.: Gordon & Belyea, Ltd., 101 Powell Street

MEXICO: C. H. Elstner, Apartado 284 Monterrey N. L.

- NAYLOR SPIRALWELD Pipe is wound on a turned mandrel and rigidly held in formation by an electrically welded spiral lock-seam truss running the entire length of the pipe. This construction assures a pipe of absolute diameter...as truly round in the middle as it is at the ends.
- The perfect roundness of Naylor SPIRALWELD Pipe is of high value in the field. It speeds up jointing, since the ends always match perfectly and coupling or welding is accomplished without costly preliminary work. Moreover, the spiral lock-seam truss greatly strengthens the pipe, protecting it against rough handling in shipping, transporting and in the field.
- The Naylor lock-seam truss structure also provides maximum structural strength, minimum weight and flexibility. Thus, Naylor SPIRALWELD Pipe...can be used for the same pressures as standard weight wrought pipe... can be shipped, hauled, strung and coupled at less cost ...and is free from the danger of damage due to expansion and contraction.
- In addition, Naylor SPIRALWELD Pipe is made of Toncan Iron, an alloy of iron, copper and molybdenum with superior corrosion-resisting properties which greatly enhance the life of the pipe. Write our nearest office for literature and further data.

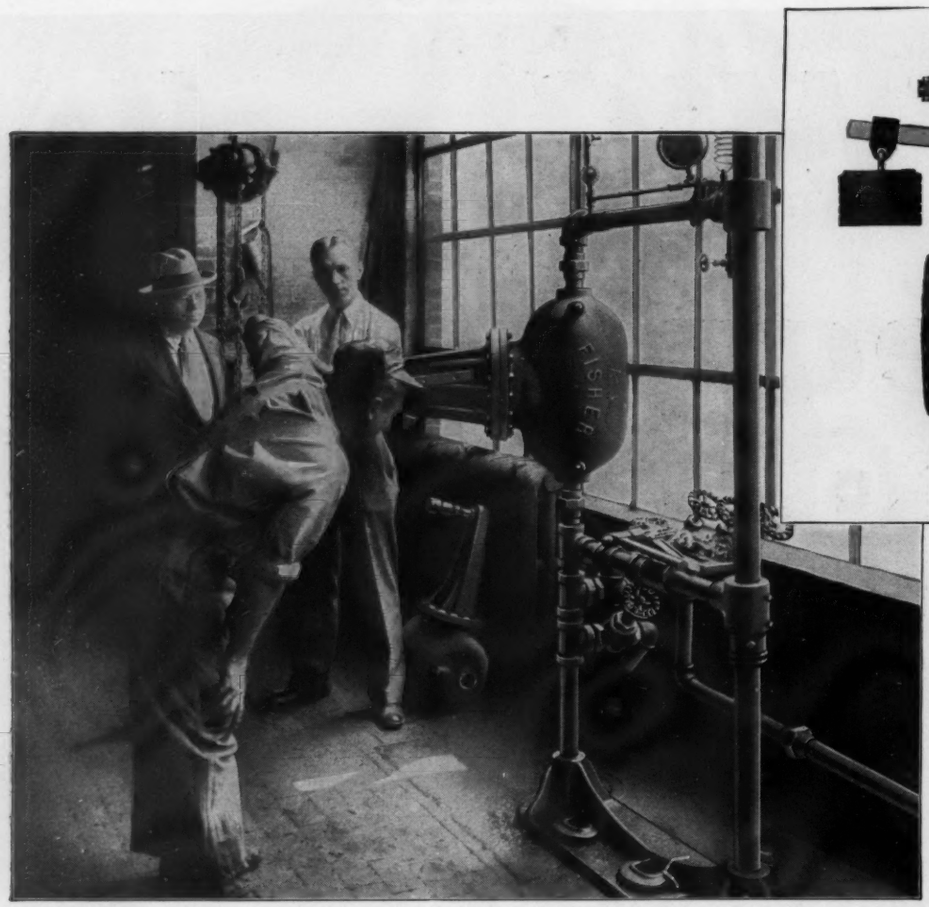
# The McGaughy Integrator Co. ANNOUNCES

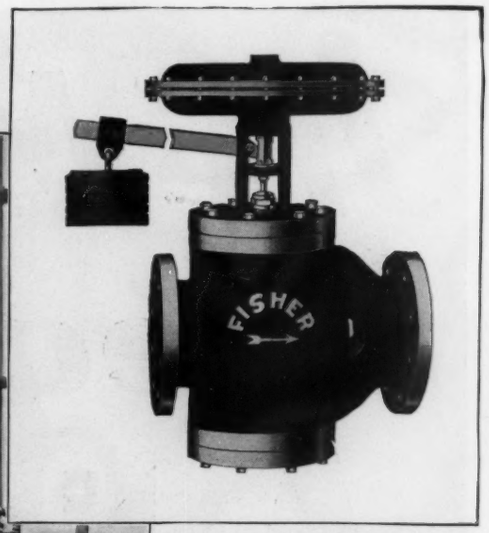
to the Gas Industry that it has disposed of its interests to the Pittsburgh Equitable Meter Company, Pittsburgh, Penna.

The superior manufacturing facilities, the many branch offices and warehouses of the Pittsburgh Equitable Meter Company will provide better machines and better service for Integrator users. The "Pittsburgh Equitable Idea" of carrying on further research work and of building only the highest quality of products will be carried out in the further production of the McGaughy Integrator.

McGAUGHY INTEGRATOR COMPANY
TULSA, OKLAHOMA

John B. McGaughy




The Type 590 Fisher Gas Pressure Regulator or Reducing Valve is primarily for low pressure service. The streamline valve body (an exclusive Fisher development) makes this regulator particularly desirable when extremely large capacity and low friction loss are required. Gas pressure of a few ounces is maintained regardless of normal pressure pulsations on inlet side.

# "You don't take *anything* for granted, do you?"

"THE operation you see here is interesting principally because it answers your question. Of course, it is to your advantage that we take nothing for granted, but at the same time we also have a selfish purpose. We simply cannot afford to jeopardize the reputation we have been building for 50 years by taking even the slightest chance.

"The float cage for every Fisher liquid level controller is tested for leakage with kerosene at a pressure equal to 150 per cent of the maximum working pressure of the controller. You know many of these controllers are used on oil at high temperatures where a leak would mean a flash and a fire.

"This operation is typical of the care taken in building all Fisher Specialties—one important reason why you have always been able to depend upon them."

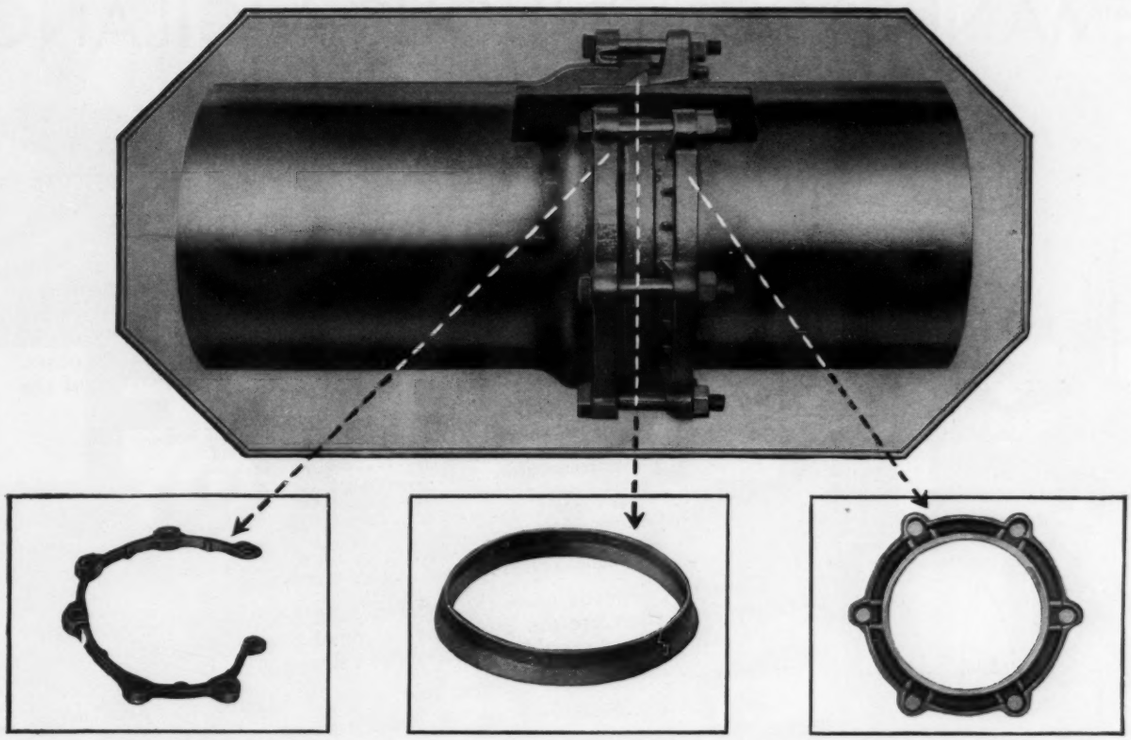
**FISHER**

THE MARK OF SCIENTIFIC FLUID CONTROL

**THE FISHER GOVERNOR COMPANY**
2400 Fisher Building Marshalltown, Iowa

# This gas-tight ANTHONY JOINT

## *saves installation time*



## Only 3 parts to assemble

ENGINEERS seeking a gas-tight joint which can be quickly and easily assembled should investigate the Anthony Joint as developed and perfected by the U. S. Pipe and Foundry Company. No troublesome details about the Anthony Joint; no complicated adjustments. Simply place one gasket, tighten two rings and your joint is complete.

The Anthony Joint will remain bottle tight under high pressures too. One gas superintendent writes: "We regard deLavaud Pipe with the Anthony Joint ideal . . . The installation was subjected to 250 pounds gas pressure for four days . . . Since then, the daily pressure is from 90 to 125 pounds." Unusual deflection is another advantage which the Anthony Joint offers. With this joint you can install a line in surprisingly steep or rolling country — without the aid of bends or special fittings.

The Anthony Joint is offered in either deLavaud centrifugally cast pipe or in pit cast pipe and fittings. All rings, bolts and gaskets are interchangeable. Of special interest is the fact that Anthony Joint bends, tees and other fittings can also be used with plain end pipe. Let us send you complete information regarding the many advantages which this new joint offers.

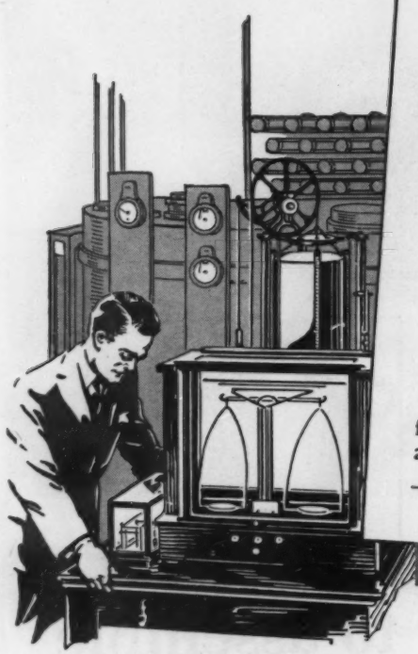
# United States Pipe and Foundry Co., Burlington, N.J.

*Sales Offices:* New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

*Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association*

# Effective Research

## DEMANDS CONTINUOUS VIGILANCE



THE DEGREE OF PRECISION DESIRED

It has been the aim to reduce the difference between the high result and the low result, derived from a series of tests of the same equipment under similar conditions, to 0.1 percent. In order to obtain this degree of precision, it becomes evident that the average value of many of the individual factors which enter into the tests shall not have an observational error of 0.01 percent. Values equivalent to 0.01 percent of the average reading of orifice coefficient test factors are:

| | | | |
|---|---|---|---|
| 1. | Barometric pressure | 0.003 | inch of mercury |
| 2. | Time for 10 minutes | 0.06 | second |
| 3. | Tape reading, seven feet | 0.008 | inch |
| 4. | Prover temperature | 0.05 | degree F. |
| 5. | Prover pressure, absolute | 0.04 | inch of water |
| 6. | Water vapor | 0.025 | percent |
| 7. | Line temperature | 0.05 | degree F. |
| 8. | Line pressure, absolute | 0.04 | inch water |
| 9. | Differential at four inches | 0.0004 | inch |

The result depends upon the differences in readings of the first four factors, and therefore the cumulative error of the readings at the start and finish of a test should not exceed the values given above.

—*From page 7 of* Bulletin E-1 *descriptive of the Erie Laboratory. This table forcibly demonstrates the high precision sought and attained.*

SINCE 1912 the Erie Laboratory of American Meter Company has been devoted entirely to research, specializing in high-pressure measurement. Tangible results of practical as well as of theoretical value to gas measurement engineering have been continuously produced.

These results are embodied in bulletins published from time to time by American Meter Company. Familiarity with these findings can frequently prevent duplicated effort in experimental research.

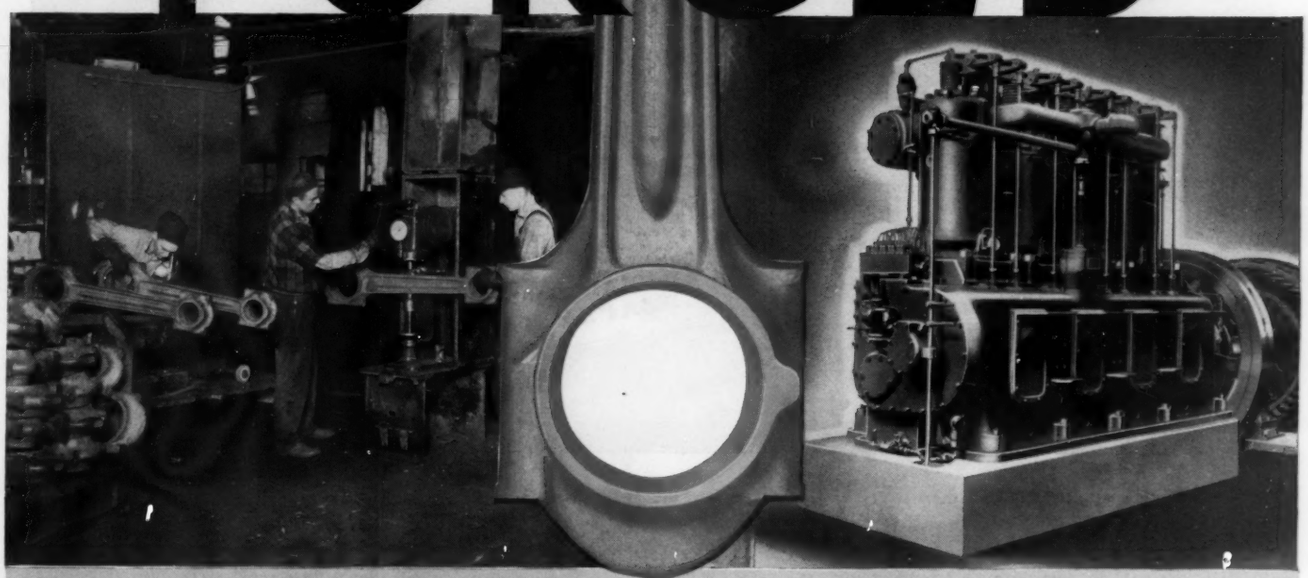
That is why we ask you to submit your measurement problems. Both of us benefit. Our experimental work has profited greatly from the interest and helpful suggestions of executives and engineers in the Gas Industry.

AMERICAN METER CO. MEASUREMENT ENGINEERS CUBIC FEET

**AMERICAN METER COMPANY**
INCORPORATED
*The World's Largest Manufacturers of Gas Meters and Allied Apparatus*
ESTABLISHED 1836
GENERAL OFFICES : 105 W. 40TH STREET · NEW YORK

JOHN J. GRIFFIN & CO. Est. 1859 · HELME & MCILHENNY Est. 1848 · D. MCDONALD & CO. Est. 1855 · METRIC METAL WORKS Est. 1888
MARYLAND METER WORKS Est. 1866 · NATH. TUFTS METER WORKS Est. 1860 · PACIFIC METER WORKS Est. 1901

# FORGED



YOU'RE ALWAYS SAFE
IN CHOOSING A
COOPER-BESSEMER

STEAM hammer, hydraulic press, Brinell hardness tester — all are vital steps in the die-forging of connecting rods for the 14¾ x 16" Vertical (by The Champion Machine & Forging Company, Cleveland, Ohio). Forging gives higher strength, extra resiliency and flawless structure. Connecting rods in Cooper-Bessemer engines from 15 to 1500 B. H. P. are *forged.*

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MOUNT VERNON, OHIO — GROVE CITY, PENNSYLVANIA

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1313 Magnolia Building, *Dallas, Texas*
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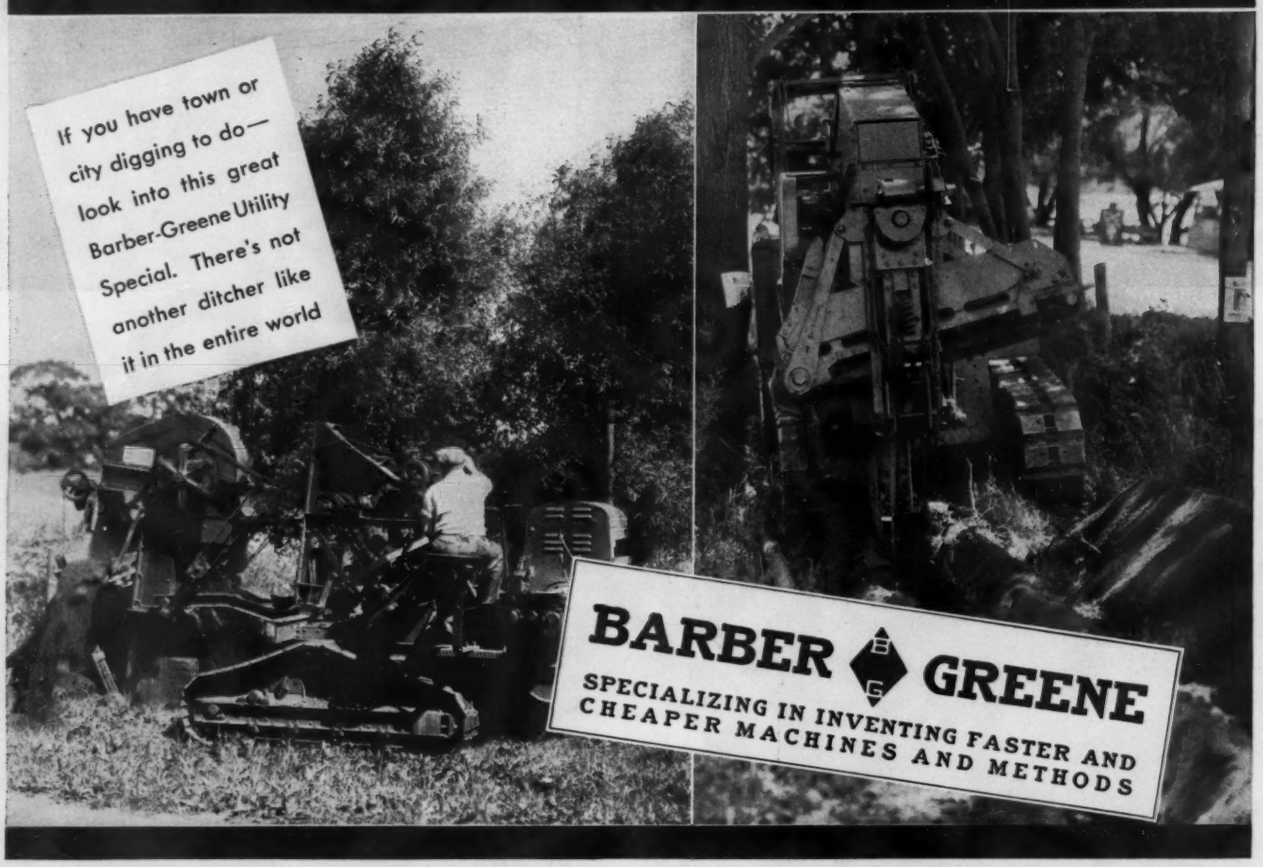
Suite No. 301, 25 W. 43rd St., *New York, N. Y.*

COOPER-BESSEMER

# The Only Ditcher with Offsetting Vertical Boom


If you have town or city digging to do— look into this great Barber-Greene Utility Special. There's not another ditcher like it in the entire world
BARBER GREENE
SPECIALIZING IN INVENTING FASTER AND CHEAPER MACHINES AND METHODS

There is not another ditcher in the entire world like this Barber-Greene Utility Special Ditcher.

It is the only ditcher with an offsetting *vertical* boom that leaves no ramps for shovelers — that jumps walks and curbs cleanly. And the offsetting feature permits you to dig close to trees, curbs, poles and fences. What's more, the B-G Boom offsets with a simple crank—even while the machine is digging.

*No other* offsetting boom ditcher is so narrow. Width is only 69 inches.

*No other* offsetting boom ditcher is so short, so compact, so easy to handle. Overall length is only 181 inches.

*No other* has the B-G delayed bucket kick-out, which puts all spoil on the conveyor. Goodbye spillage.

*No other* has milling action digging, which walks through macadam, frozen ground, hard pan and similar things at which ordinary ditchers cough apologetically and stop.

*No other* has the patented *Mechanical Brain*—B-G Overload Release Sprocket—which protects underground pipes and the machine itself. It trips when the digging teeth hit anything unusual and picks up the load automatically if you decide to go through.

And the operator gets a wide range of mechanical digging speeds. Fifteen are at the operators fingertips. Many more are available through sprocket changes.

As for construction—try to match it anywhere.

Bucket Chain is identical with that used on all Barber-Greenes.

Transmissions are enclosed, running in oil. Boom raises by power. Spoil conveyor is adjustable and reversible. Follow-up scraper insures a clean ditch. Crawlers are full length with low ground pressure and automatic take-up. Big 38 h. p. engine provides one h. p. for every 290 pounds of weight.

STANDARDIZED MATERIAL HANDLING MACHINES

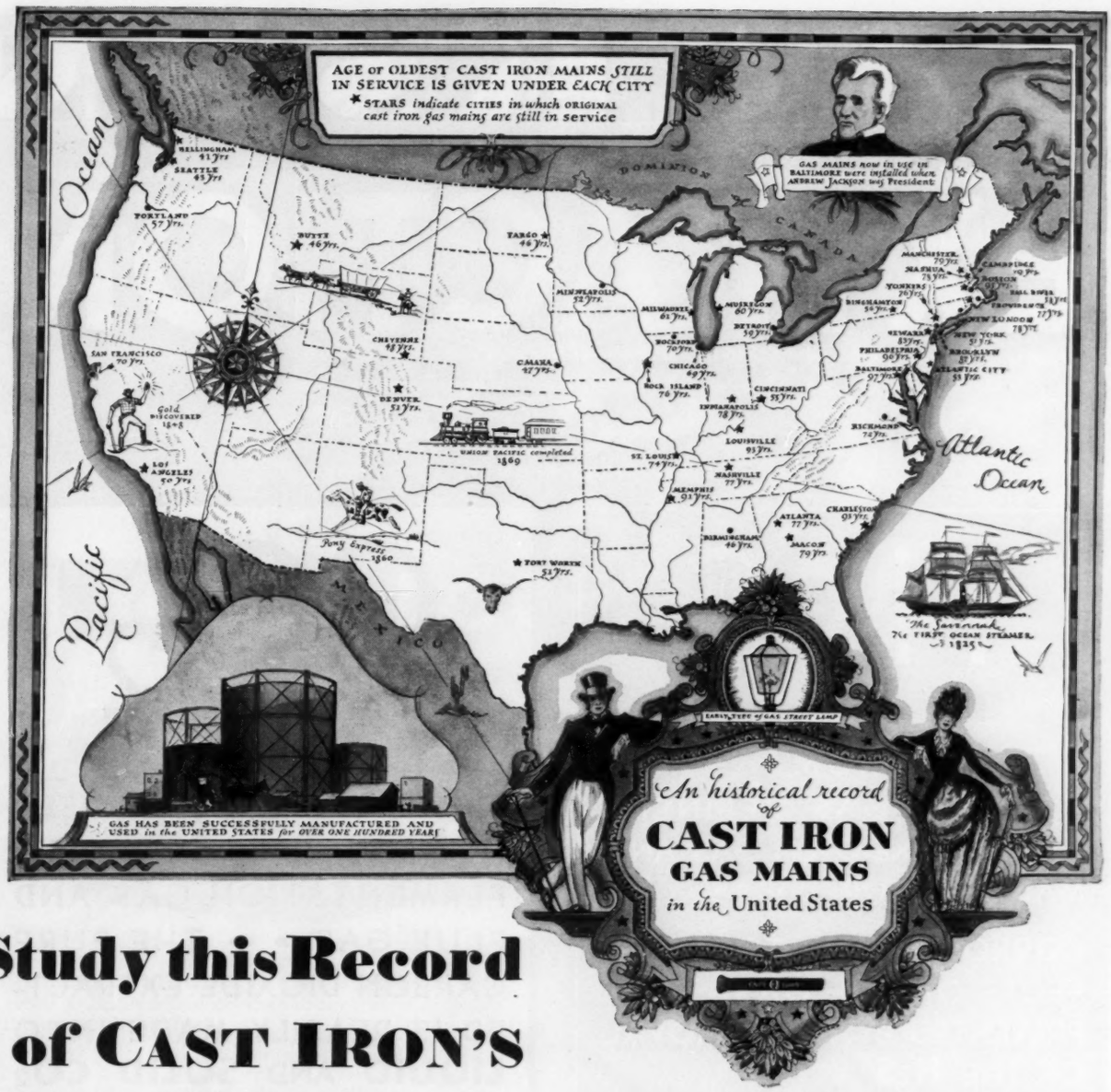
**BARBER-GREENE** **712 WEST PARK AVENUE, AURORA, ILLINOIS**

Bucket Loaders · Coal Loaders
Snow Loaders · Trailers
Loaders with Weighing and Batching Hoppers

Loaders with Vibrating and Grizzly Screens
Coal and Coke Car Unloaders
Permanent Belt Conveyors

Portable Flight Conveyors
Standard Gas and Water Ditchers
Pipe Line Special Ditchers
Belt Car Unloaders

Portable Belt Conveyors
Self-Propelled Flight Conveyors
Utility Special Ditchers
Service Special Ditchers


AGE OF OLDEST CAST IRON MAINS STILL IN SERVICE IS GIVEN UNDER EACH CITY
★ STARS indicate CITIES in which ORIGINAL cast iron gas mains are still in service
GAS MAINS NOW IN USE IN BALTIMORE were installed when ANDREW JACKSON was President
Pacific Ocean
Atlantic Ocean
DOMINION OF CANADA
MEXICO
BELLINGHAM 41 Yrs.
SEATTLE 45 Yrs.
PORTLAND 57 Yrs.
BUTTE 46 Yrs.
FARGO 46 Yrs.
MINNEAPOLIS 52 Yrs.
MILWAUKEE 61 Yrs.
MUSKEGON 60 Yrs.
DETROIT 50 Yrs.
CHEYENNE 48 Yrs.
OMAHA 47 Yrs.
CHICAGO 69 Yrs.
ROCKFORD 70 Yrs.
ROCK ISLAND 76 Yrs.
CINCINNATI 55 Yrs.
INDIANAPOLIS 78 Yrs.
DENVER 52 Yrs.
SAN FRANCISCO 70 Yrs.
LOS ANGELES 50 Yrs.
Gold DISCOVERED 1848
UNION PACIFIC completed 1869
Pony Express 1860
ST. LOUIS 74 Yrs.
LOUISVILLE 93 Yrs.
MEMPHIS 91 Yrs.
NASHVILLE 77 Yrs.
BIRMINGHAM 46 Yrs.
ATLANTA 72 Yrs.
MACON 79 Yrs.
CHARLESTON 91 Yrs.
RICHMOND 74 Yrs.
BALTIMORE 97 Yrs.
PHILADELPHIA 96 Yrs.
NEWARK 83 Yrs.
NEW YORK 91 Yrs.
BROOKLYN 87 Yrs.
ATLANTIC CITY 53 Yrs.
NEW LONDON 78 Yrs.
PROVIDENCE 77 Yrs.
BINGHAMTON 52 Yrs.
YONKERS 76 Yrs.
NASHUA 73 Yrs.
MANCHESTER 70 Yrs.
CAMBRIDGE 90 Yrs.
FORT WORTH 51 Yrs.
"The Savannah" THE FIRST OCEAN STEAMER 1825
EARLY TYPE OF GAS STREET LAMP
GAS HAS BEEN SUCCESSFULLY MANUFACTURED AND USED in the UNITED STATES for OVER ONE HUNDRED YEARS
An historical record of
CAST IRON
GAS MAINS
in the United States

# Study this Record of CAST IRON'S great durability in gas distribution service

IN OVER SEVENTY PER CENT. of the 44 cities shown on the above map, the *original* cast iron gas mains are still in service. Even in the 13 cities whose original mains have been replaced due to street construction or the need of larger capacities, the age of the oldest cast iron mains in service averages over 64 years.

But in spite of this recorded evidence of the great durability of oldtime cast iron mains, engineers are free to admit that the quality of cast iron pipe of today is even better. Modern laboratory control and production methods assure a degree and uniformity of quality not possible under oldtime procedure and with oldtime equipment.

We shall be glad to send free, on request, a copy of the above map enlarged for framing (14 x 14), printed in sepia on de luxe stock.

For information regarding the advantages of specifying modern cast iron pipe for modern gas mains, address The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Ill.

* * * *

Cast iron pipe bearing the "Q-check" trademark of The Cast Iron Pipe Research Association is obtainable from the following leading pipe founders: Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Company, Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Ave., Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Company, Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe and Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Corporation, 11 Broadway, New York.

# CAST IRON PIPE

# JACKSON EXTRACTION OF

## $H_2S$

FROM NATURAL GAS, REFINERY GASES, COKE-OVEN GAS AND MANUFACTURED GAS.

CORROSIVE AND TOXIC EFFECTS OF THE GASES ARE PREVENTED BY THE REMOVAL OF THE $H_2S$ . . . . .

## $CO_2$

FROM NATURAL GAS, GASES USED IN CHEMICAL PROCESSES, FERMENTATION GAS AND FLUE GAS » » THE PURE CARBON DIOXIDE EXTRACTED IS READILY MADE INTO **LIQUID** AND **SOLID $CO_2$**

## COMPLETE PLANTS — MANUFACTURED *and* INSTALLED

**THE GIRDLER ABSORPTION PROCESS** — ECONOMICAL — EFFICIENT — COMMERCIALLY TESTED

ADDRESS INQUIRIES TO NEAREST DISTRICT OFFICE . . . PATENT PROTECTED

30 Church St. NEW YORK

Magnolia Bldg. DALLAS

11 E. 5th Ave. TULSA

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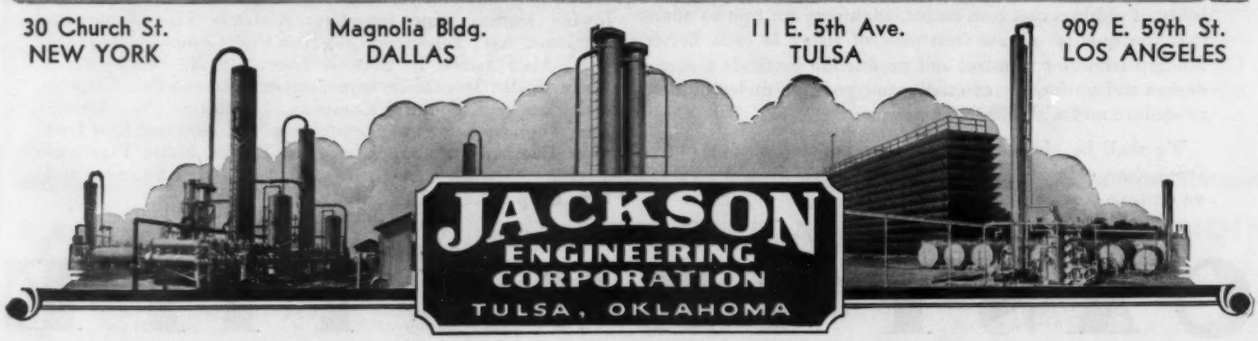
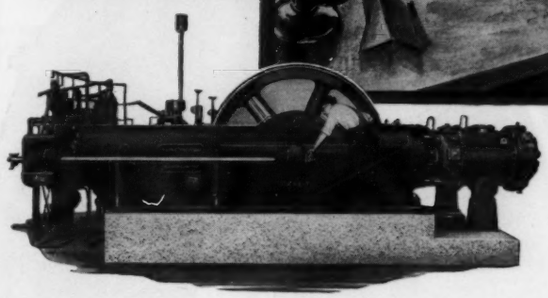


**JACKSON ENGINEERING CORPORATION**

TULSA, OKLAHOMA

# Some Day

## YOU'LL LOOK BACK—



*and congratulate yourself that your compressor equipment bears the name*

## TRANSIT

Uninterrupted service to the consumer has been given so much attention that today gas is probably the most reliable fuel.

A few years ago, pipe lines carrying natural gas half way across this Continent were only dreams. Today they are realities. Truly, natural gas is in the public eye as never before.

Of course, this advance in the gas industry has called for a corresponding advance in equipment to handle it.

This TRANSIT 17 x 24" Twin Gas Engine-Gas Compressor was brought out to meet a definite demand for a thoroughly reliable up-to-date engine of this size and type. TRANSIT ENGINES have always been noted for their long life. Many of the first gas engine compressors built over thirty-five years ago are still in daily service. Strength is there by reason of correct design and not by a lot of unnecessary metal.

TRANSIT ENGINES are built strong— for long life.

Send for our 48 page catalog on this Compressor. It is described in detail.

**TRANSIT** *Gas Engines*

BEAUMONT, TEXAS
E. L. Wilson Hardware Company

LOS ANGELES
Republic Supply Company of California

TULSA and MID-CONTINENT FIELD
Frick-Reid Supply Corporation

**NATIONAL TRANSIT PUMP & MACHINE CO.**
**OIL CITY, PA.**

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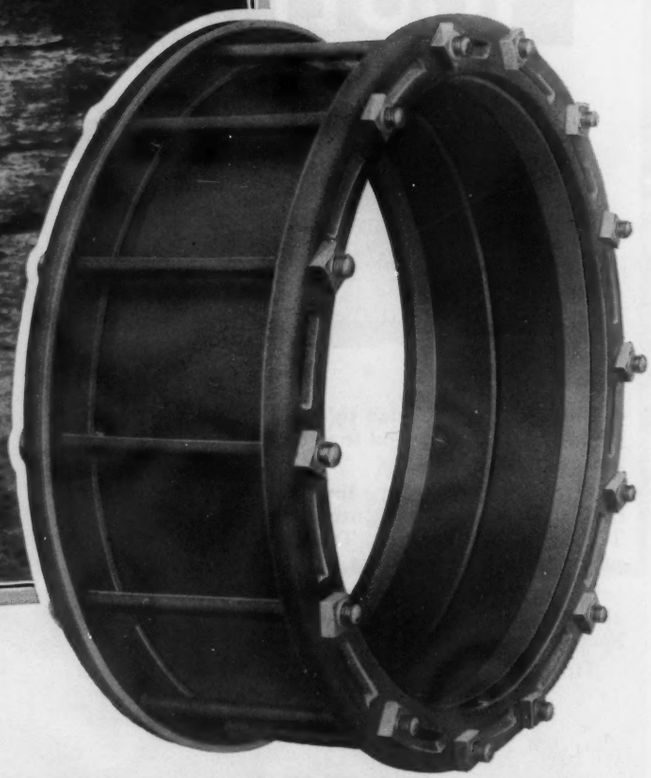

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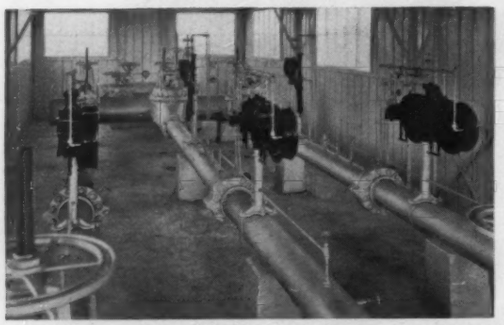
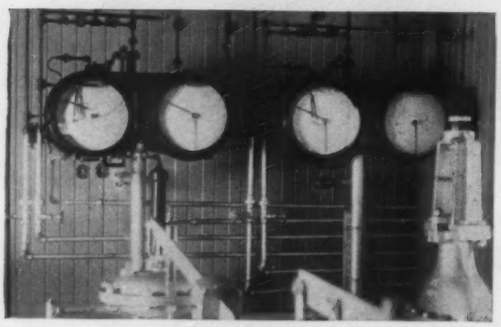
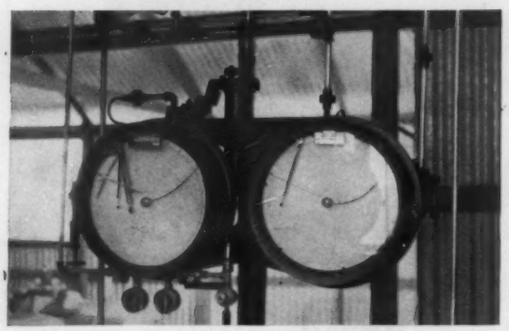


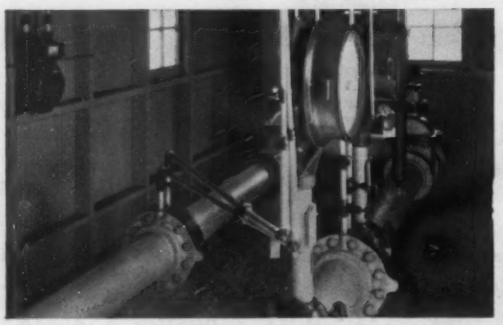
*Lone Star Gas Company, Texas*



*Arkansas Natural Gas Co.*



*Texas City Gas Co.*



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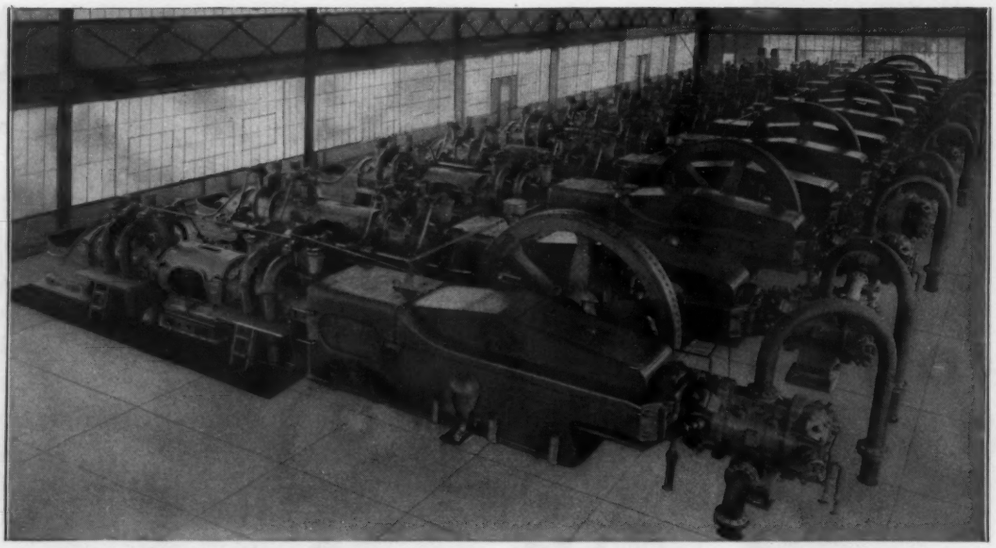
LOAD

*Six Worthington Twin-tandem Four-cycle Double-acting Gas-engine-driven Gas Compressors at the Fredericktown, Missouri, Station of the pipe line from the Louisiana Gas fields to St. Louis.*



# 1931 Facts . . . *about Worthington Gas Engine Compressors*

THE construction of additional natural gas pipe lines during the past year has further strengthened Worthington's position as a builder of gas-engine-driven gas compressors. These facts speak for themselves:

1. Worthington is the oldest builder of gas engines in the United States. The first unit of this type of equipment was built for the Columbia Natural Gas Company in 1900.

2. Worthington gas engines, now installed, total close to 450,000 horsepower.

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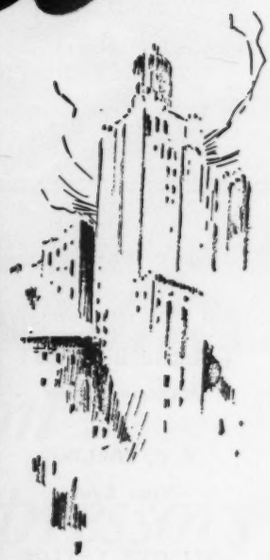
# Goodwill



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*(The photograph above shows Hydrauger in use near old Sonoma, in "The Valley of the Moon.")*

HAVE you learned of the revolutionary advance in public utility construction methods, by use of the **Hydrauger?** This new earth-boring tool — an ingenious hydraulic auger — means much in earning and keeping that precious asset, public goodwill, for it reduces pavement-cutting to a minimum.

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July, 1931

# WESTERN GAS

"Reg. U. S. Pat. Off."

Vol. VII, No. 7

**A Monthly Journal of the Gas and Gas Appliance Industries in *Western America***

# Review of the Month

ANTI-MERCHANDISING legislative activity is a theme song which continues to ring in the utility ear. California and Illinois have recently challenged this type of legislation and effectually halted anti-merchandising bills while they were still in the committee stage. Other states, notably Oklahoma and Kansas, have enacted prohibitory statutes within the past few weeks. Tennessee has a bill of similar intent pending.

It is idle to reason into the "why's" of the situation. This type of agitation is as old as utility merchandising itself. The sore point which the utilities should take to heart is that the agitation has been allowed to gain headway. "What to do about it" calls for immediate answering, and in no uncertain terms. The answer may not be the same for any two states, but the crying need is for a generally firm attitude in defense of the inherent right and obligation to promote load by sales work. In the great majority of states the issue has not developed to a point where legislation is imminent. In these states the utilities will do well to bring the underlying reasons for their merchandising to public notice, and strive unceasingly to place the benefits of utility sales before everyone affected—dealer, public, consumer. In the few states where prohibitory legislation is already enacted the utilities have a choice of accepting the situation, and turning their load building efforts into dealer cooperative channels—or of testing out legality of this type of legislation. While the course to be taken will necessarily be governed by local circumstances, it would seem self-evident that the merchandising issue is not one with which the utilities can safely temporize.

## Two Utilities Add Sales Departments

Utility merchandising in spite of legislative obstacles in one or two sections, grows by natural steps at other points. In Washington, Northwest Cities Gas Co. announces formation of a merchandising department; Northwest States Utilities Co. is opening a merchandising office in Great Falls, Montana; both companies will conduct active direct sales work.

## Northwestern Search For "Natural" Continues

In one form or another rumors of natural gas development on a large scale in the Pacific Northwest continue to be heard. Moody-Seagraves Co., of New York now figures in late reports as having leasing operations under way on some 40,000 acres of Willamette Valley area in western Oregon, with a drilling program planned for early 1932.

## Peak Season for Gas Construction

With summer at its height, construction news again draws the lion's share of attention in the gas industry. Important transmission systems, newly finished or in advanced stages, include that of the Western Gas Co. into Arizona and Mexico—finished early last month; the Natural Gas Co. of America line to the Chicago area, all but 100 miles of which has been completed by Continental Construction Corp.—the balance to be finished by July 15; United Gas System's new unit into Louisiana—started in December of last year, completed late in June; Northern Natural Gas Co's system into Iowa and Nebraska points, complete to Mason City last month.

Rushing toward completion in time for fall loads are numerous other carriers, begun this past spring or early in the summer. This category includes the Montana Power Co. enterprise bringing gas to Butte, Helena, Anaconda; the North Central Gas Co. project, which has reconditioning work well under way on an oil line to carry natural gas to points in eastern Wyoming and western Nebraska; the Southern Fuel Co. 26-inch carrier, to deliver Kettleman Hills gas to southern California. These and further projects are covered in detail in news pages of this issue.

At the marketing end of this major line construction, distribution and change-over crews are facing a heavy summer schedule. Chicago is preparing her distribution system to carry a volume of mixed natural and manufactured gas throughout this primary market area. Thirty towns in Louisiana must be fitted for natural gas service on the United extension; Mason City and Des Moines, Iowa; Las Vegas, N. M.; Butte, Helena, Anaconda and Bozeman in Montana; Globe, Bisbee, Douglas in Arizona—these and other towns too numerous to mention are on the "change-over" or "turn-on" list. There is hardly a state in the West which does not have some distribution construction program under way, making ready for the coming of natural gas. This summer and fall will be one of the most active construction seasons the industry has yet seen.

Under the head of newly launched transmission projects comes a reported

*(Continued on Page 59)*

# Market Analysis *and* Survey

## *A Practical Tool for the Sales Executive*

By A. P. STRYKER

*Assistant to the General Sales Manager*
*Pacific Gas and Electric Company*

*AMONG sales department heads there grows a well founded belief that a detailed knowledge of the territory in which they are doing business is essential equipment for sales progress. Mr. Stryker, who heads a Pacific Coast Gas Association committee enterprise on market analysis and survey, here contributes a practical discussion of the type of information which will best serve the sales executive in constructively planning his program. His remarks were given before the recent joint conference held by Commercial, Public Relations, and Publicity and Advertising Sections of the P.C.G.A. at Los Angeles.—Editor.*

THE object of this presentation is to bring out the vital need of statistics as a background for the planning of sales activities and the practical application of data from this source.

The primary objective of a gas sales executive should be a maximum development of load at a profit. Although every executive recognizes this principle in theory, he does not always apply it to his everyday operations.

The Business Training Corp., which has made a thorough study of utility practices for the American Gas Association and has written a course on sales administration and management in the gas industry, says that when most gas sales executives consider a new type of appliance, they usually take the following course:

Compare the wholesale prices offered by competing manufacturers.

Examine the helps offered by manufacturers in the way of advertising, sales promotion material, and salesmen.

Consider manufacturers' data showing sales of the appliance in other communities.

Study the reports of the A.G.A. laboratory on the appliance.

Study the technical features of the appliance.

Consider the location of manufactuerers' plants or warehouses and the speed with which orders can be filled.

### *What They Usually Do Not Do*

Study records of appliances now in use by gas consumers to estimate size of potential market.

Study the market by actual canvass, questionnaire, or other means, to discover the probable acceptance of the appliance at the contemplated selling price.

Make a test of the acceptance of the appliance in a representative section of their own territory.

Attempt to forecast sales for the appliance on the basis of the market analysis and to judge the probable effect of its sale on the profitable expansion of the load.

Statistics are only of value when they can be applied principally to the solution of the sales problem; therefore much study and thought must be given the subject before any statistical program is inaugurated.

There are two extremes to this situation—one in which there is too much statistical information, and the second in which there is none.

In the first case, too many statistics require too much time to keep up and are also very confusing when trying to apply them to the solution of the sales problem. Too many statistics are just as bad as none at all.

In the second case, the sales executive has no facts on which to base his decision and must grope his way along more or less by guess work and his best business judgment.

It is recommended, therefore, that the executive set down those items which he would like to know and then go over this list with the thought in mind of eliminating those which are not absolutely essential for his information and guidance.

A market analysis program has three definite phases: (1) Determining what basic information is essential, (2) how to get it and (3) how it may be used.

In the first place, it is suggested that the following information be obtained:

(a) Market saturation by appliances.

(b) Class of people in the community.

(c) Index of buying power.

(d) General economic conditions and possibility of future growth.

(e) General employment conditions.

All of these factors have a considerable bearing upon the development and operation of any sales program.

The second phase deals with how to get this information. The market saturation by appliances may be obtained in two ways—through surveys by the sales organization or canvassers especially delegated to do this work, and, secondly, by the service crews handling complaints and adjustments. It is appreciated that from an economical point of view it is not practical to obtain immediately a complete survey of every consumer on the company's lines. But, for example, if a community has 20,000 consumers, information which is based on a survey of, say, 2,000 will result in a very good idea of what it may be expected to find in the territory as a whole.

To use a survey term, this is known as "sampling." This test device is used by advertising and direct-by-mail organizations before the inauguration of any large program. A direct-by-mail organization develops a program to send out a half million pieces of literature, and before this is done approximately 500 to 1,000 pieces are mailed in order to determine the pulling power of this campaign. The launching of the complete program is dependent upon the results obtained from this sampling process.

The third phase is, how may these data be used to assist in the development of a sales program?

To use the case method, we are presenting some data from a California utility on two towns as examples.

CASE 1

| | |
|---|---|
| Type of town | Industrial |
| Number of consumers | 4,040 |
| Average class of consumer | Mechanics; laborers |
| Employment situation | Generally steady; a few violent fluctuations |
| Economic condition | Good; building on the upgrade for last 3 years |
| Average income per family | $1,670 |

*(Continued on Page 66)*

*No. 3 compressor station at Planeport, near Fort Bliss*

*Central power house, Phelps Dodge Copper Queen branch, Bisbee.*

*Making degree bend in Malpais deposit.*

*Installing river crossing, Rio Grande River.*

# New Mexico Gas *for* Arizona

## *Western Gas Co. 290-Mile Texas-Mexico Line Completed Ahead of Schedule; To Operate at 625-Lb. Pressure*

THE building of the Western Gas Co. high pressure natural gas line, 12¾ inches in diameter and capable of working at a pressure of 900 pounds, together with four compressor stations at a cost of approximately $6,000,000 by the Western Gas Co., a subsidiary of the El Paso Natural Gas Co., has been completed 45 days ahead of time. The line, which went into service early in June, extends westward from the present terminus at El Paso, Texas to Douglas and Bisbee, Arizona and Cananea, Mexico, to serve the Phelps Dodge Corp., the Calumet and Arizona Mining Co., the Cananea Consolidated Copper Co., the Arizona Edison Co., and adjacent and intervening territory. Paul Kayser is president of the Western Gas Co., H. G. Frost, vice-president and general manager, and A. L. Forbes, Jr., general superintendent.

*By* H. G. FROST

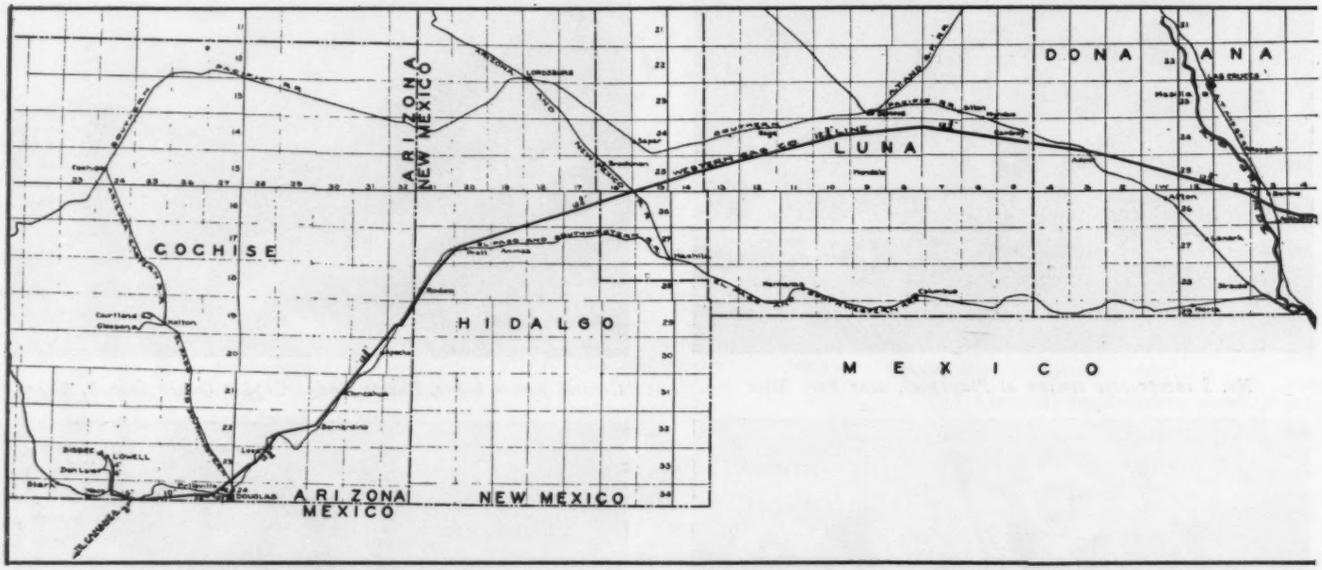
*Vice-President and General Manager Western Gas Company*

The 16-inch and 12¾-inch pipe used on the line was manufactured by the A. O. Smith Corp. of Milwaukee, by a new process. The 12¾-inch pipe has an ultimate tensile strength of about 80,000 pounds per square inch, and the finished pipe shows a yield point of about 30 per cent in 2 inches. This line has a capacity of substantially 52,000,000 cubic feet daily. Pipe of smaller size than 12¾ inches was purchased from Republic Steel Corp. of Youngstown, Ohio.

The welding was done by the A. O. Smith Corp.'s electric method, separate generators being used for each welder. The procedure in the firing line weld was to line up tack on skids up to 10 joints of 40-foot pipe. This pipe was double belled, with a welding ring. Each welder did a complete string of pipe, making his first pass and moving down the line, and then returning and making the second pass.

### *The Line Route*

The line, which stood a test pressure of 750 pounds, starts at a point about six miles east of the center of El Paso on the existing line from Jal, New Mexico to El Paso. From this point the 16-inch line extends in a northerly direction 7¾ miles to Compressor Station No. 3. At this point the line is reduced in size to 12¾-inch O.D. pipe, and continues on in a generally northerly direction along the east side of the Franklin Mountains through a gap known as Anthony Pass, and down the west side of the mountains to the Rio Grande Valley. About six miles of the line passes through




*New Mexico-Arizona system, showing Western Gas Co.'s newly completed line to Arizona*

the irrigated section along the Valley, across the Rio Grande River; thence for about three miles through rough sand hills up on to the Mesa. From this point for 50 miles the line extends almost straight to the North end of the Florida Mountains, across flat, practically level ground. From this point the line starts to swing South across practically level range land to Antelope Pass, through the Pellincillo Mountains, a distance of about 82 miles; thence it traverses level valley down to the Pedregosa and Peralla Mountains for about five miles, where rather rough country is encountered, and from there the line extends in a general slope to Douglas, Arizona.

At this point an 8-inch and 6-inch branch extends to the smelters of the Phelps Dodge Corp. and the Calumet and Arizona Mining Co. at Douglas, and a 4-inch extension is carried on for the City of Douglas. From the above junction a 10-inch line extends to the west, running down to the International Boundary line, about 13 miles west of Douglas. At this point an 8-inch line crosses the border and is carried on down in a general southwesterly direction for 38½ miles to Cananea, Sonora, Mexico. At the take-off of the Cananea line a 6-inch line is carried west and north to the power plants at the mines and concentrators of the mining companies at Lowell, Warren and Bisbee.

It is a remarkable point that in about 290 miles of line there is only one river crossing. This crossing is the Rio Grande River, the distance between banks being only about 140 feet, and the distance between headers about 300 feet. This river crossing was constructed by the installation of two 10-inch welded lines, with river clamps at each joint in the bed of the river.

The valves installed in the main 12-inch line are series 40 cast steel valves. On this section of the line all the valves used were 8-inch with fabricated venturi nipples on each side, the length of taper in these nipples being 20 times the reduction in diameter between the size of the line and the size of the valve.

In no case was the pipe bent in passing through rough country. Factory bends with belled ends were used for both sags and over-bends and for side bends. The ditch was graded to fit these bends and pipe was either cut and two bell or spiggot bends made, or bends were welded into the line with the center ring. The strings of pipe were picked up by two caterpillars, stabbed and tacked immediately. The tie-in welding machines followed behind the tacker and as soon as the line was tied in it was lowered, with slack loops left about 600 feet apart, the section between the slack loops, which was on the bottom of the ditch, being backfilled. Early in the morning, when it was still cool, these slack loops were dropped into the ditch and the line completely backfilled.

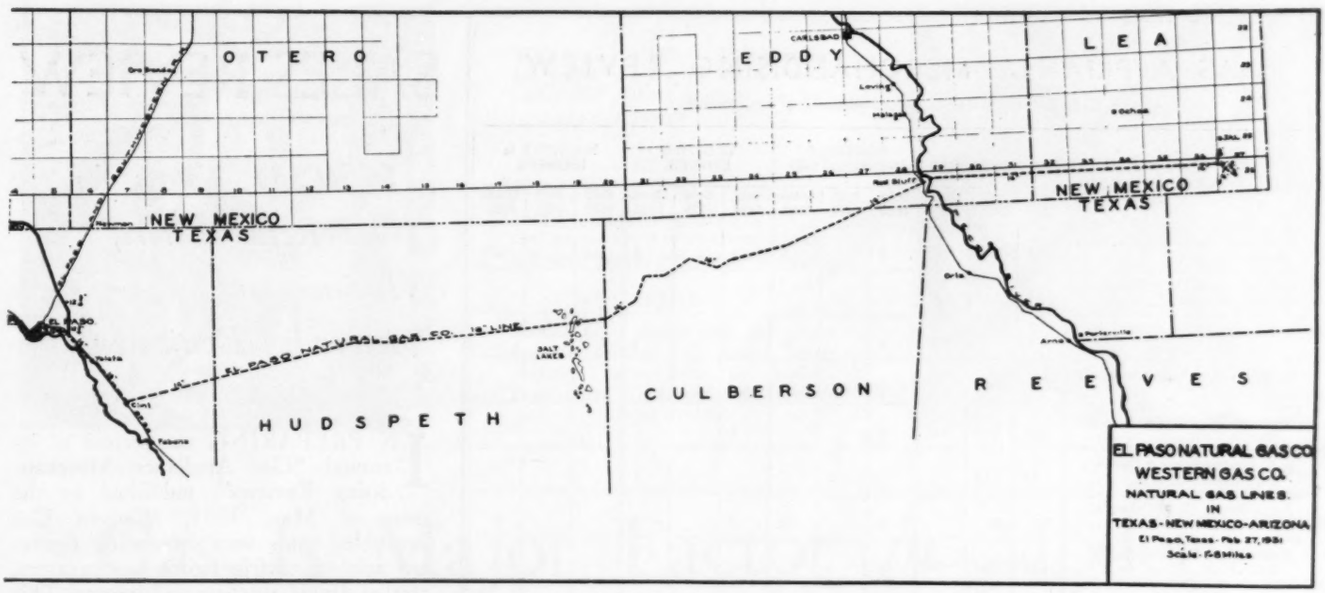
### *Ditching Under Difficulty*

When the survey was made rock soundings were made at intervals of at least every 200 feet, and these were plotted on the survey maps. These soundings indicated that over a very considerable portion of the line caliche would be encountered from one to two feet below the surface. Considerable anxiety was felt as to whether it would be possible to cut this with an ordinary type ditcher. When this caliche was encountered it was found that by slowing down the large wheel type ditchers used to about one-half to one-third of the speed used in soft earth, it was possible to cut this material with practically no difficulty. It also was a great benefit, because ditching could be carried ahead with the assurance that the ditch would stand up practically indefinitely. Through the mountain passes and in certain spots along the line considerable rock was encountered, but the rock, exclusive of caliche, did not cover over 10 per cent of the entire system. Considerable difficulty was encountered in one three-mile strip in going through lava beds. This rock was hard and somewhat difficult to shoot, but as the ditching had been carried considerably ahead of the laying, no particular delay was experienced in passing through this section.

No timber was encountered in clearing, and it was possible to do a large portion of this clearing by the use of a 60 caterpillar with a road grader. The only material which had to be cut from the right of way was a small amount of mesquite and yucca.

Due to the unsettled nature of the country, a roadway was constructed along about 80 per cent of the line, so that it is possible to patrol the major portion of the line with a car. No telephone line is being built along the right-of-way, but at intervals of 20 to 30 miles stub lines are being run in from a circuit on the main trans-continental lines, which more or less parallel the line.

Stringing was done entirely with large trucks and trailers, and in general the length of haul was comparatively short, the maximum haul being not much over 15 miles. The country being generally




*and Mexico on the left. System of El Paso Natural Gas Co. is shown on the right*

flat, it was possible to drive to the line at almost any point desired without long hauls to get around rough country.

A detailed soil analysis was made of the entire line before the starting of construction, and soil samples were taken at least every mile. The soil conditions, in general, were found to be exceptionally non-corrosive, and the findings of the engineers making this analysis were that about 30 per cent of the line was in non-corrosive territory, about 40 per cent in slightly corrosive territory and only 30 per cent in what might be called corrosive territory. The protection used was in all cases a hot enamel. Attempts were made to roll the strings of pipe after welding, but although it was possible to roll the strings, the application of enamel by this method was not found to be satisfactory, and all painting has been done by the brush application of primer and the "Granny Rag" application of the enamel. In sections near the smelters where the soil conditions were extremely corrosive a coating of er amel, followed by a wrapper with a second coat of enamel on top of this was used. Where soil conditions were shown to be corrosive, a heavy coating of enamel was used, and where conditions showed only slightly corrosive a lighter coating was applied. In sections shown as non-corrosive, no paint was applied.

*To Operate at 625 Lbs.*

It is planned at the present time to operate this line with a maximum pressure of 625 pounds, but the line has been constructed with the idea of probably increasing this pressure at a later date to 750 or 800 pounds. This is made possible by the high yield point in the pipe, the pipe in the mill being given a hydrostatic test of 1485 pounds, and hammered on the weld while the pressure is on the pipe. The line underwent a 750-pound test, following completion of construction.

There are four compressor stations being constructed in connection with the pipe line, two on the existing 16-inch pipe line from Jal, New Mexico, to El Paso, and two on the new 12-inch line from El Paso to Douglas. The first station is located 72 miles from the gas field, the second 67 miles from the first, the third, near El Paso, 69 miles along the line, and the fourth 108 miles from El Paso near Gage, New Mexico.

All stations are similar, except that the stations on the existing 16-inch line are designed for maximum gas pressure of 500 pounds per square inch, while those on the new line are designed for a maximum pressure of 750 pounds per square inch. All stations have three compressors except the one near Gage, which has two. The stations are designed for expansion to an ultimate capacity of eight compressors. A description of a typical station will therefore serve for all.

*Typical Compressor Station*

Each station consists generally of three 760 h.p. double acting twin tandem gas compressors together with the necessary auxiliaries, buildings, water supply, and employees' cottages. The buildings at each station are: A compressor building, approximately 54 ft. x 90 ft.; an auxiliary building approximately 20 ft. x 71 ft.; a garage and warehouse; a well house and five employees' cottages. The compressor, auxiliary and well buildings are of structural steel construction with corrugated asbestos siding and roofs. The garage and warehouse are wood frame construction with asbestos siding, while the cottages are of frame construction. There are four four-room cottages and one six-room cottage with recreation hall at each station.

The compressors are double acting 24-inch stroke, those for Stations 1 and 2 having 11-inch bore and those for Stations 3 and 4 having 9½-inch bore. They are mounted in pairs, each pair being driven by one Cooper-Bessemer 19-inch x 24-inch twin tandem double acting horizontal gas engine rated at 760 h.p. at 180 r.p.m. The normal working pressure for Stations 1 and 2 is 450 lbs. per sq. in., maximum 500 lbs. per sq. in.; while the normal pressure for Stations 3 and 4 is 625 lbs. per sq. in., maximum 750 lbs. per sq. in. The capacity of the 450-lb. pressure compressors is 21,900,000 cu. ft. per 24 hours with a compression ratio of 2, while the capacity of the 625-lb. compressor is 21,400,000 cu. ft. per 24 hours with the same compression ratio.

The gas from each compressor is cooled in a closed gas cooler, those for Stations 1 and 2 being 24 inches in diameter by 144 inches long, containing 1185 sq. ft. of surface, and those for Stations 3 and 4 being 20 inches in diameter by 168 inches long, containing 869 sq. ft. surface.

The coolers are of the floating head type with cast steel heads, Admiralty tubing and naval bronze tube sheets.

There are two starting air compressors per station, each 5x2½x4-inch, two cylinder directly connected to a four cylider gas engine.

The electric generators, water pump, and machine shop are located in the auxiliary building.

*(Continued on Page 59)*

## GAS APPLIANCE MERCHANDISING REVIEW

Refrigerators—Incinerators—Laundry Equipment

| COMPANY | REFRIGERATORS | | | PORTABLE INCINERATORS | | | CLOTHES DRYERS | | | WASHERS & IRONERS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sold 1930 | Sold 1929 | Quota 1931 | Sold 1930 | Sold 1929 | Quota 1931 | Sold 1930 | Sold 1929 | Quota 1931 | Sold 1930 | Sold 1929 | Quota 1931 |
| Little Rock Gas & Fuel Co., Little Rock, Ark. | 133 | | 110 | 6 | | 3 | 2 | | 3 | 358 | | 280 |
| Coast Counties Gas & Electric Co., Los Angeles, Calif. | 14 | 14 | 20 | | | | | | | | | |
| Natural Gas Corp. of Calif., San Francisco, Calif. | 3 | | 100 | 2 | | 20 | | | 1 | | | |
| San Joaquin Light & Power Corp., Fresno, Calif. | 7 | 32 | | | | | | | | | | |
| Southern Counties Gas Co., Los Angeles, Calif. | 634 | 752 | 762 | 3 | | | 3 | 4 | | | | |
| B. C. Electric Power & Gas Co., Ltd., Vancouver, B. C. | 14 | 12 | | | 1 | | | | | | | |
| Public Service Co. of Colorado, Denver, Colo. | | | | 18 | | 91 | 2 | | 9 | | | |
| Pueblo Gas & Fuel Co.. Pueblo, Colo. | 17 | 41 | 25 | 2 | 1 | | | | | | | |
| Honolulu Gas Co., Honolulu, T. H. | 24 | 31 | | | | | | | | | | |
| Council Bluffs Gas Co., Council Bluffs, Iowa | 5 | | | | | | | | | | | |
| Des Moines Gas Co., Des Moines, Iowa | 64 | 22 | | 1 | 1 | | | 1 | | | 5 | |
| Ft. Dodge Gas & Electric Co., Ft. Dodge, Iowa | | | 6 | | 1 | 6 | | 1 | 5 | | | |
| Iowa City Light & Power Co., Iowa City, Iowa | | | 4 | | 2 | 6 | | | 2 | | | 2 |
| Iowa Public Service Co., Sioux City, Iowa | | | | | | | | | | 767 | | |
| Ottumwa Gas Co., Ottumwa, Iowa | 19 | 4 | 20 | 1 | 3 | 4 | | 2 | 4 | 119 | 116 | 204 |
| Sioux City Gas & Electric Co., Sioux City, Iowa | | | | | | | | | | 63 | 64 | 42 |
| Clayton Gas Co., Independence, Kans. | 11 | 5 | | | | | 2 | 1 | | | | |
| Dalhart Gas Co., Independence, Kans. | 5 | 8 | | | | | | | | | | |
| *Western Utilities Stores Co., Salina, Kans. | 2 | 16 | | 1 | 2 | | | 1 | | 5 | 47 | |
| Southern Cities Distributing Co., Shreveport, La. | 40 | | 80 | 1 | | 20 | | | 1 | | | |
| New Orleans Public Service Inc., New Orleans, La. | 39 | | 100 | | 1 | | | | | | | |
| City of Duluth Water & Light Dept., Duluth, Minn. | 2 | 3 | 50 | | | 15 | | | 5 | | | |
| Minneapolis Gas Light Co., Minneapolis, Minn. | 450 | 400 | 1,000 | 50 | 375 | 25 | 5 | 10 | 25 | | | |
| Minnesota Northern Power Co., Minneapolis, Minn. | 42 | 45 | | 15 | 6 | | 3 | 1 | | 225 | 235 | |
| Northern States Power Co. Minneapolis, Minn. | 26 | 6 | 140 | 39 | 33 | 97 | 3 | | | 4 | 14 | |
| †Gas Service Co., Kansas City, Mo. | 378 | 496 | | 662 | 286 | | 16 | 25 | | 3,348 | 2,208 | |
| General Utilities Co., Kansas City, Mo. | 17 | | 35 | 3 | | 25 | | | | | | |
| The Laclede Gas Light Co., St. Louis, Mo. | 260 | 231 | | 29 | 65 | | 3 | 20 | | 382 | 769 | |
| The St. Louis County Gas Co., Webster Groves, Mo. | | | | 22 | 22 | 50 | | 5 | 5 | | | |
| National Utilities Co. of Missouri, Kirksville, Mo. | | 2 | 10 | | | | | | | | | |
| Great Falls Gas Co., Great Falls, Montana | 26 | 31 | 40 | | | 15 | | | | | 6 | |
| Central West Public Service Co., Omaha, Neb. | 5 | | 16 | | | | | | | | | |

*Includes sales of several properties affecting 1929 totals which were disposed of during latter part of that year.

†Gas Service Co. totals cover sales of the following subsidiary companies:—Carthage Gas Co., Jackson County Light, Heat & Power Co., Joplin Gas Co., Kansas City Gas Co., Ozark Distributing Co., St. Joseph Gas Co., Webb City & Carterville Gas Co., The Arkansas Valley Gas Co., Capital Gas & Electric Co., Girard Gas Co., The Hutchinson Gas Co., The Newton Gas Co., The Pittsburg Gas Co., Union Service Co., The Western Distributing Co., The Wichita Gas Co., The Wyandotte County Gas Co., Nebraska Distributing Co., Bartlesville Gas & Electric Co., Consumers Gas Co., Union Public Service Co.

# SALES REVIEW

## *1930-31 Totals for Gas Refrigerators, Incinerators, Laundry Equipment*

IN PREPARING the second of its annual "Gas Appliance Merchandising Reviews", published in the issue of May, 1931, *Western Gas* assembled some very interesting figures on sale of refrigerators, incinerators, clothes dryers, washers and ironers. This information did not appear in the May number due to lack of space, the appliance sales totals published in that issue including only the classifications of ranges, hot plates and laundry stoves, water heaters, space heaters, furnaces, and furnace conversions.

Beginning on this page is presented information on these additional appliance sales, supplementing and completing the annual merchandising review. Reference to the May issue, pages 45 to 49 inclusive, will round out the picture of gas utility appliance merchandising.

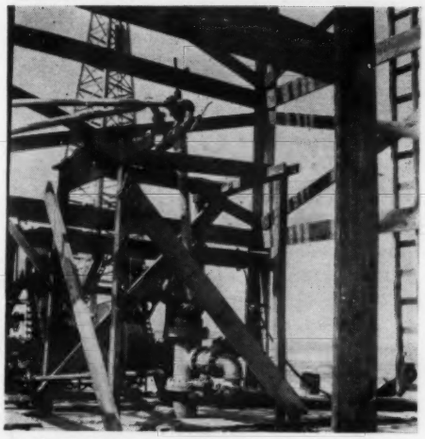
Individual companies submitted their sales totals to *Western Gas* for the purpose of this survey; hence the showings may be accepted as accurate. It will be noted for the most part that companies leading in sales results for the cooking, water heating and space heating appliances, also are well represented in the refrigerator, incinerator and laundry classifications.

In the accompanying tables the 1930 sales are contrasted with those of the year previous, and many of the companies supply quotas which have been set up for accomplishment in 1931. In practically all cases quotas call for sales increases over 1930.

General merchandise sales totals were given in the May issue, indicating that 1930 utility sales held nearly level with those of the record year of 1929. Appliances covered in the current tabulation were included in the merchandise dollar totals as given in the May issue.

It will be noted from the accompanying tabulation that the refrigerator, incinerator and laundry equipment sales figures are assuming more importance each year in the total of merchandising done by utilities. Several companies number their refrigerator sales by the

*(Continued on Page 60)*



*LEFT:*

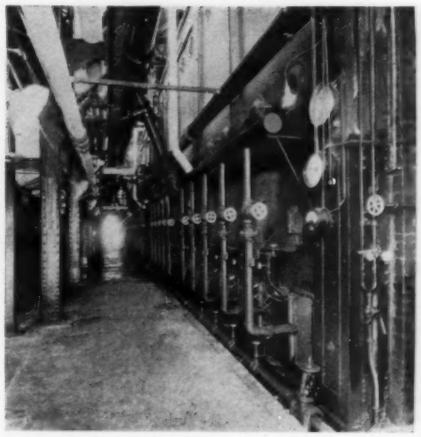
*Well head equipment through which hot water is pumped underground, under 250 pounds pressure and sulphur is forced to surface.*

*RIGHT:*

*Battery of 12 boilers showing gas burners. Boilers operate at 200 per cent of rating, and consume 14,000,000 cubic feet of gas per 24-hour day.*

*BELOW:*

*Pumps force water into hot water heaters, against 125 pound boiler pressure encountered in heaters. Live steam is forced into heaters from boilers.*



# Gas Is Major Factor *in* Modern Sulphur Mining Process

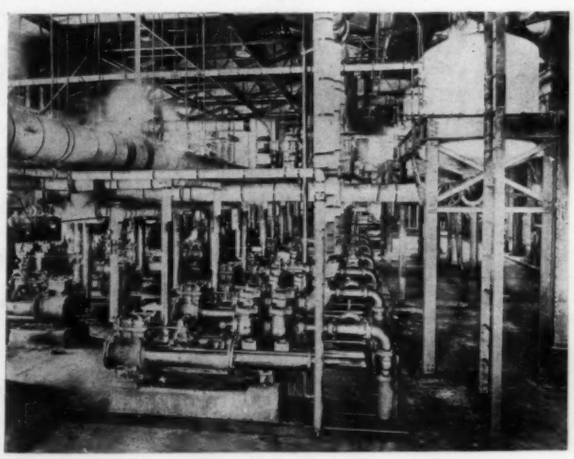
*By* J. B. NEALEY
*American Gas Association*

SULPHUR, either directly or indirectly, enters into the manufacture of a surprisingly large proportion of everything we use, and yet, for many years we have been dependent on imports from Italy, Sicily, Japan and Spain for our supplies. Today this situation is reversed and the United States dominates the world markets for this element. This came about through the discovery of rich deposits in the cap rock formation of the Salt Domes in Texas and Louisiana and the development of a cheap method of mining them. At the present time 85 per cent of the world's sulphur is produced by two American concerns.

The method of production used is known as the Frasch system of mining, in which water, heated considerably above the melting point of sulphur, is pumped through wells into the subterranean strata and the liquefied sulphur forced to the surface with compressed air. It required many years of experimental work to perfect this method, for the operations of melting and pumping are concurrent, continuous and complex.

According to W. T. Lundy, who has worked out the geology of this new district, "There are more than 100 salt domes, located in Louisiana and Texas, and in the majority of these, sulphur is present in varying, but usually small amounts, and available information indicates that, in so far as drilling has progressed, seven only of the 100 domes contain sulphur in commercial quantities. The salt domes of the Gulf Coastal Region all lie within a belt not over 75 miles wide, adjacent to the Gulf of Mexico in the States of Louisiana and Texas, and is bounded on the East and West by the Mississippi and Rio Grande Rivers.

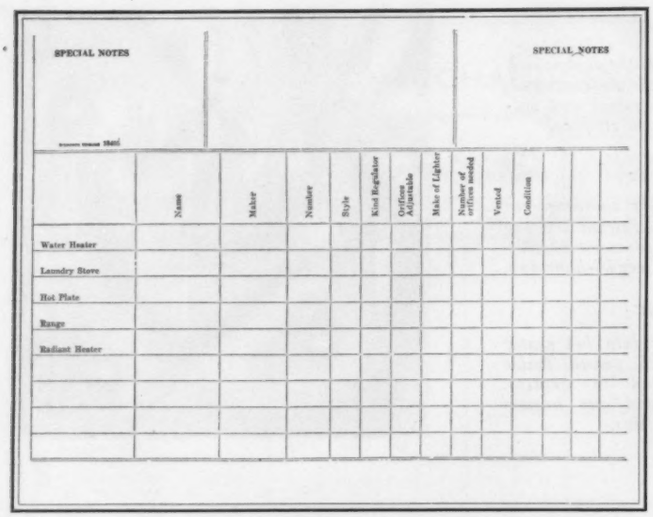
"Structurally, salt domes may be divided into three parts, namely, the salt core, the cap rock and overlying and abutting sediments. Immediately overlying the salt core are the cap rock formations which consist of any or all of the following minerals: sulphur, anhydrite, gypsum, dolomite and limestone, the latter in many cases being altered to marble and calcite. The normal order of occurrence is porous and sulphur bearing limestone, underlain by barren and impervious anhydrite, which in turn lies in well defined contact upon the salt. When sulphur is present in these salt domes it occurs in the cap rock above the salt, and in general the sulphur constitutes the filling in seams, and the lining of cavities and is disseminated and impregnated through the porous formations. The sulphur horizons of the various domes range from a few feet in thickness to more than 250 feet, and average in sulphur content from a bare trace to approximately 50 per cent. In each of the four sulphur deposits which are at present being mined there is a decided difference in the relative positions of the sulphur horizons in the cap rock."



These deposits were discovered while drilling for oil and lie at depths ranging from 800 to 1500 feet from the surface.

The largest cost factor entering into the mining of sulphur with the Frasch system is that of securing, treating, heating and distributing water, enormous quantities of which are

*(Continued on Page 46)*

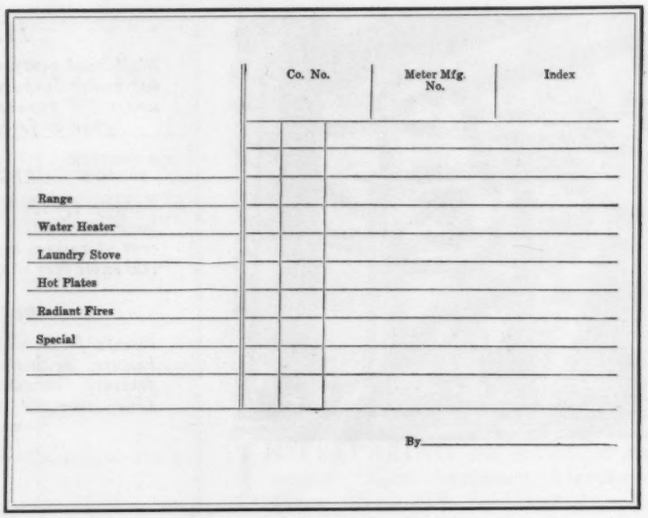


SPECIAL NOTES

SPECIAL NOTES

| | Name | Make | Number | Style | Kind Regulator | Orifices Adjustable | Make of Lighter | Number of orifices needed | Vented | Condition | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Heater | | | | | | | | | | | | | |
| Laundry Stove | | | | | | | | | | | | | |
| Hot Plate | | | | | | | | | | | | | |
| Range | | | | | | | | | | | | | |
| Radiant Heater | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

*Fig. 1*



| | Co. No. | Meter Mfg. No. | Index |
|---|---|---|---|
| | | | |
| Range | | | |
| Water Heater | | | |
| Laundry Stove | | | |
| Hot Plates | | | |
| Radiant Fires | | | |
| Special | | | |
| | | | |
| | | | |

By_____

*Fig. 2*

# Efficient Change-Over Methods Followed *at* Mandan *and* Bismarck, N. D.

*By* ALBERT P. THOMAS
*Bismarck Division, Minnesota Northern Power Company*

*Change-over crew which conducted work at Mandan and Bismarck, N. D. A. P. Thomas, who describes the change-over, is fourth from the left in the front row.*

IN THE appliance change over from manufactured to natural gas at Bismarck and Mandan, North Dakota, the first step was a preliminary survey of consumers appliances, the consumers list being used for this purpose and then checked against the meter book and other available information so as to avoid missing any usable appliances. A white card, (Fig. 1) was used to set down the manufacturer, style, number and condition of various appliances being served by the company. The name and address of the customer was stamped in the top center section of this card. The addressograph billing plates were used for this purpose. These cards were routed by streets and were fastened in books to avoid mixing. When returned to the office, the cards were placed in ring holders, each street being kept separate. The cards were then filed in labeled pigeon holes and kept for record, proving very valuable when the actual change-over was in progress. They were used to check the work order cards, thus avoiding as far as possible the missing of a customer or a customer's appliance.

From these cards lists were made showing all the various appliances with the number of orifices or adapters needed, and orders were placed accordingly for the material necessary. Orifices and adapters were ordered for the ranges, hot plates, laundry stoves and tank heaters. For radiant-type heaters we ordered new burners. For the storage water heater systems new jets, and in some cases new burners were ordered.

*Work Card:* From the preliminary survey cards the work order card (Fig. 2) was designed for the use of the men making the actual change-over. The top left corner section of this card was used for the name and address. One of the small columns on this card was used to check the appliances at each address. This was done so that the men would know the exact appliances to be worked on.

*Water Heater Warning Card:* The preliminary survey revealed the fact that in Bismarck and Mandan approximately 200 water heaters were being used without vents. It was decided that as soon as natural gas was turned into our mains these unvented heaters would not be given gas service until vented. Red tags (Fig. 3) were prepared, numbered and printed with a perforated section line so that we would have a record where warning cards were placed.

*Red Warning Card:* Another two-section numbered red warning card (Fig. 4) was printed for use on all appliances that could not be perfectly adjusted the first time the service man called.

OVER a period of the last several years *Western Gas* has brought numerous accounts of appliance change-over operations to its readers. These have principally concerned methods and procedure in larger communities, among them Denver, Salt Lake City, Los Angeles, San Francisco, and others. But the task of change-over is by no means limited to larger cities, and handling the exacting details of the job in smaller centers calls for the same careful planning, though the work proceeds on lesser scale. To companies operating small distrubuting properties the account here contributed by Mr. Thomas will be of value, describing as it does a very successful program of appliance change-over at Mandan and Bismarck, N. D.—*Editor.*

*Blue Warning Card:* A blue warning card (Fig. 5) was also printed, to be used where the adjuster could not gain admittance to the customer's premises. One of these cards was securely fastened by thumb tacks on the front door and one also on the back door.

*Plan for Doing Actual Change-Over Work:* It was decided to use all the available fitters and other men found suitable for this work. Approximately 25 men were picked out and given instructions and some actual experience on the work that they would be called upon to perform. In order to have natural gas for the men to experiment with in the various appliances, two large containers were constructed, shipped to Hebron and filled with natural gas. As soon as a container was emptied it was refilled.

The work order cards were divided so that each man would have from 10 to 15 cards to work on. With the work order cards were attached a number of water heater warning cards and regular warning cards which were to be charged against the man taking them out. This was done to avoid the loss of any cards. He was also to be furnished with a number of blue warning cards.

A tool box with the necessary tools was to be furnished each man.

These small tool boxes contained one of each of the following articles: 10-in. wrench, 6-in. wrench, pair off-set pliers, 4-oz. ballpein hammer, adaptor anvil, crimping tool, small brush for testing, soap can, large screw driver, small screw driver, putty knife, cold chisel, flash light. A couple of large pieces of rag and a little steel wool were also included.

The top compartment of these tool boxes carried a sufficient supply of orifices and adaptors, paper clips and thumb tacks for a day's work.

The following adaptors and orifices were ordered for the conversion work: adaptors, No. 1 plug orifices, No. 8 plug orifices, No. 11 lion orifices, No. 10 cap orifices, No. 6 cap orifices.

No. 221

Montana-Dakota Power Co.

**WARNING**

It is dangerous to use this Water Heater until vented.

The Company requests that this Heater be vented before using.

.....

No. 221

Unvented Water Heater

Name _____

Address _____

By _____

*Fig. 3*

No. 369

**WARNING**

Do Not Use This

_____ Until

This Tag Is Removed by Company Employee

.....

No. 369

Name _____

Address _____

Town _____

Appl. _____ By _____

*Fig. 4*

The following tools were also ordered: Small reamers, large reamers, reamer handles, crimping tools, and adaptor anvils.

A man was to be assigned a number of work order cards, a record of the route he was to follow being kept by the dispatcher. He was then to start out on his route leaving a small chalk mark on the sidewalk at the entrance to each premises. This was done so that a man could be located if necessary. He then was to enter customer's premises and adapt or adjust top burners on the range, burners on hot plate or laundry stove and also tank heater. A warning tag was to be placed on the oven and if the hot water heater was found unvented, he was to place a warning card on it. Radiant-type heaters were also to be tagged.

The water heaters, although carrying a warning card, were to be adjusted so as to make the appliance safe as possible in case the warning should be disregarded. The bottom halves of both warning cards were to be filled out and signed and then fastened with a clip to the work order card. Most of the lighters in use on ranges in this territory were not adjustable, so all lighters were to be removed and plugged with $\frac{1}{8}$-in plugs. These lighters were to be replaced later with new ones.

After leaving the premises the man was to place a second chalk mark so that the inspector would know the job was completed.

*Actual Work at Mandan, N. D.:* The evening before the change-over a special man was sent to turn off and red tag all storage heaters and heaters equipped with Lawson valves. After turning on natural gas this man was responsible for the conversion and proper operation of these heaters. As soon as the gas was turned on several special men were sent to convert heavy duty equipment in the restaurants. The rest of the men started on the regular change-over. The work progressed nicely as planned.

There were approximately 390 appliances to be converted in Mandan, con-

*(Continued on Page 58)*

**WARNING**

***Our special service man called here and found premises locked. The gas appliances in use here have not been adjusted for use with natural gas.***

**MONTANA-DAKOTA POWER CO.**
**Phone 1030**

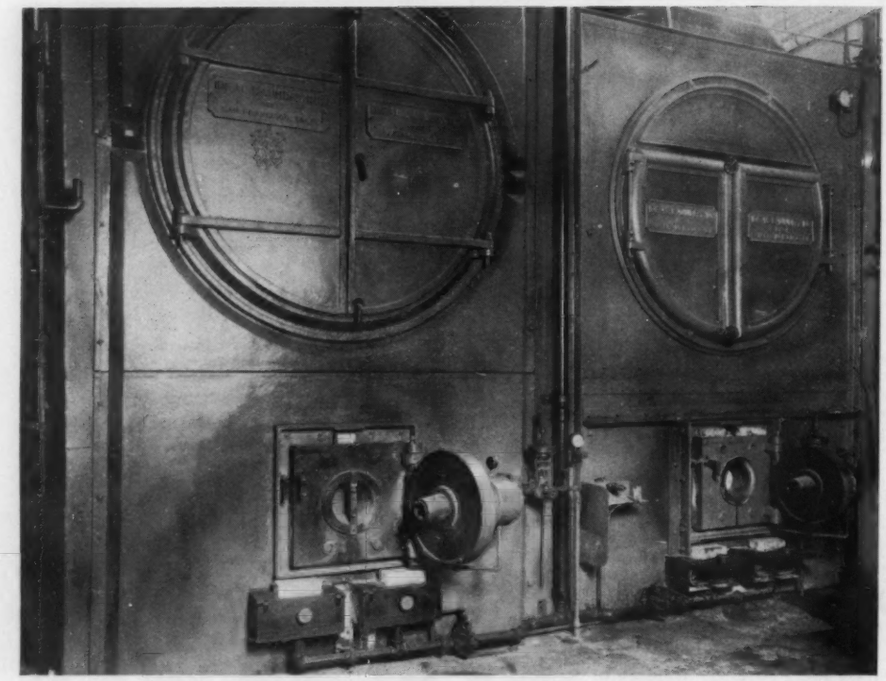
*Fig. 5*

FINAL CHECK _____

| | Vented | Place for Vent | |
|---|---|---|---|
| Range | | | |
| Water Heater | | | |
| Laundry Stove | | | |
| Hot Plate | | | |
| Radiant Fires | | | |
| Special | | | |

Date _____ By _____

*Fig. 6*



*Boiler equipment at the Ideal Laundry, San Francisco, now burning natural gas. Two gas burners fire each unit. Oil burners for emergency use are seen at right of firing doors in the illustration.*

# Converting *the* Laundry *to* Natural Gas

*By* R. L. GRUTZMACHER

*Industrial Engineer, Natural Gas Equipment, Inc.*

THE conversion of the boiler plants of large commercial laundries to the use of gas has presented an interesting problem to the gas industry. Prior to the availability of natural gas, conversions were practically impossible because of the fact that oil fuel was cheap and also because conditions in the majority of laundry boiler rooms were such as to contribute to the careless use of this cheaper fuel. Consequently, manufactured gas could not compete with oil in cost, and the gas company had no effective means of obtaining the load.

Natural gas, however, has proven itself as the fuel to overcome this obstacle. It is being sold at rates which compete favorably with liquid fuel, and in the case of larger laundries, is being sold at rates considerably less than those for liquid fuel. The important feature is that this load now properly belongs to the gas company regardless of the gas rate, just as long as it is in a class with the ordinary fuel cost.

Concerning the general laundry situation as it exists today, it may be noted that individual laundries are combined into strong, active working associations which are organized for the purpose of developing and advancing plant conditions and operations, and improving the service to the public.

To this end the associations have made steady progress in research on textiles, soaps, bleaching agents, etc., in order to render a superior service. The ultimate aim, of course, is to develop the commercial laundry so that the wash day in the home will be eliminated, in much the same way as the commercial bakery has eliminated baking day from the housewife's calander.

The laundry industry, like any other industry of today, is highly competitive, and the reduction of operating expenses is highly important and necessary to success, whether it be in the use of soap or fuel. The matter of fuel cost is largely taken care of through the "surplus gas" type of rate schedule, and it is a foregone conclusion that a direct saving in fuel cost is effected in many cases.

This is not to imply, however, that any crude usage of natural gas will result in a fuel cost saving. Indeed, it is with the efficient application of natural gas that the gas engineer must concern himself chiefly, because the margin of saving in actual fuel costs may be so small as to demand the most efficient use of the fuel in order to keep the load on the lines.

It is a particularly happy situation in San Francisco that no installation has had to be sold twice on the use of gas; that is to say, each installation has proven satisfactory in operation to the extent that the consumers are satisfied with the economy or efficiency, or both.

The important thing to remember is that there are other considerations in laundries aside from the bare cost of the fuel, and a salesman should reconcile himself to the idea that a job or prospect is just as good a possibility when the savings are zero, or even when gas fuel would cost more than the present fuel, as if the savings were 20 per cent of the previous oil costs. The natural course of events should be expected, however, where the gas costs are such as to draw an even comparison with the present fuel usage. The cost of the investment must certainly be justified in the opinion of the plant operator.

In cases such as this, where the salesman is called upon to employ his best and greatest selling effort, it is imperative that he know the problems which will confront him in laundry installations. He must speak with assurance on what gas will do for the plant owner and why it will warrant making the investment in burner equipment.

Tremendous strains are imposed on the average laundry boiler. In many cases where laundries operate their own isolated plants we can see the loads registered on the ammeter as all motors are thrown on, and we can see the pressure gauge on the boiler go down as a large number of mangles are brought into operation at one time. This loss in pressure may be such that their fires are

*(Continued on Page 58)*

*Cover of campaign folder for the Vancouver "fire and water" sale*

# Hot Water *for* Vancouver, B. C.

## *This 26-Day Sale Put 492 Water Heaters into Service for B. C. Electric Railway*

*By* J. FREMONT

*Gas New Business Department, British Columbia Electric Railway Co., Ltd.*

FOR some considerable time we have been concerned over the small number of water heaters sold—the percentage compared with the number of gas ranges installed being very small. Our domestic rate,* which governed the use of a water heater, seemed to be too high to encourage customers with an average income to use a reasonable supply of hot water.

Having decided that our rate was retarding the use of water heaters, we introduced a special combination rate a few months ago, offering our customers who were using central heating, or space heating, the privilege of connecting their water heater to the same meter.

To make this clear it is necessary to state that we have had, for some time, a special heating rate governing the use of one or more gas fires, or space heaters, of 75c per 1,000 cubic feet (all consumption) with a minimum charge of 50c per month, October to March inclusive.

This has been instrumental in our selling a large number of gas fires, as on this rate we have over 4,500 consumers.

**Domestic Rate:*

| | | |
|---|---|---|
| First | 1,000 cubic feet | $1.40 per M net |
| Next | 4,000 cubic feet | 1.25 per M net |
| Next | 15,000 cubic feet | 1.20 per M net |
| Over | 20,000 cubic feet | 1.15 per M net |

*J. Fremont*

We made a careful survey and found that the majority of these customers had a very inadequate hot water supply — relying on coils in the furnace, on a kitchen heater, or a coal stove. This, to us, looked like the easiest field of attack, as we could practically guarantee, on our special rate, 1,500 gallons of hot water per month for around $3.50.

Our method of selling appliances is to quote a price for the appliance, the installation to be on a time and material basis, or, as an alternative, in the case of a water heater, we would connect on a flat rate of $10( providing the gas stub was within 4 feet of the tank.

For the campaign three special offers were selected. Special No. 1 was a tank water heater which sold for $20.50 including installation charges, with a 50-cent down payment and a monthly payment of $1. Special No. 2 was an automatic or storage water heater at $82.50, installed, with a down payment of $1 and 5 per cent of the balance per month. The third special was a gas fire, installed, on terms of 50c down and 5 per cent of the balance per month.

Figuring that there might be many who would wish to take advantage of our special rate, and install both a fire and water heater at the same time, we offered gas fires on special terms of 50c down, and the balance in 20 monthly payments—making a flat charge of $10 to connect any fire.

We also offered automatic water heaters, of the instantaneous or storage type, on terms of $1 down and the balance in 20 monthly payments, with no connection charges (this with the idea of encouraging the installation of a better class of water heater).

The greatest number of tank heaters we had ever sold, in one particular month was 92, and using this as a guide, we based our quota for the campaign as follows:

200 tank heaters,
50 automatic water heaters,
50 fires.

Proving that the sale was an unqualified success, we reached our quota for tank water heaters half-way through the month with total results as follows:

During the 26 working days of the campaign a total of 492 water heaters were sold (tank and automatic). Gas fires to the number of 56 were sold.

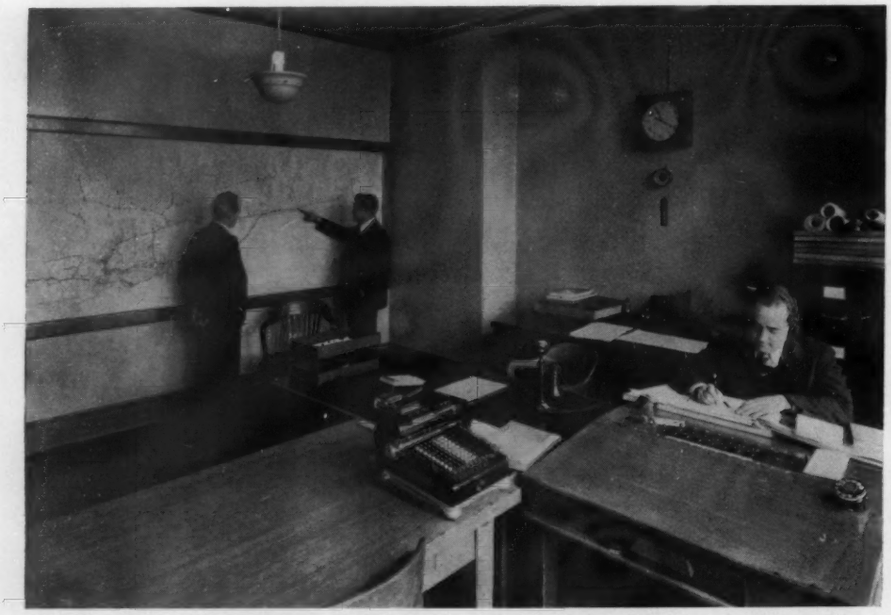
Cash value of sales, including connections, came to $13,540.92 for water heaters, and $2,744 for fires.

Upon analyzing the sales, we found that instead of the majority being installed on the combination rate, the reverse was the case, as 384 were connected to the ordinary domestic rate.

This gives us a splendid field to work on for gas fire sales in the Fall, when we can approach all these customers and show them where they can reduce their operating expenses for hot water.

Our advertising program cost $1,293 (approximately 8 per cent of the merchandise selling price) and included liberal newspaper advertising, 30,000 broadsides, and radio announcing, with of course, all the available window space in our three showrooms. From this campaign we anticipate an annual gas output of over 12,000,000 cu. ft., with revenue approaching $12,000.

"Fire and Water Sale" was the slogan adopted for the campaign, which was used in special advertising and in direct mailing pieces.



*Gas control room, Pacific Gas and Electric Co., showing wall map and dispatcher's switchboard. From left to right, R. T. Peterson, chief gas dispatcher; Fred F. Doyle, manager natural gas division, and Chas. Smith, gas dispatcher at switchboard.*

# Gas *on* P.G. *and* E.

IN ORDER to properly operate the new 800-mile natural gas transmission system of the Pacific Gas and Electric Co. it was necessary to construct a reliable communication system and organize a gas dispatching department in the Natural Gas Division of the company.

The natural gas transmission pipelines extend north from the Buttonwillow gas fields, in Kern County, Calif., 28 miles west of Bakersfield, to the Kettleman Hills, thence on through the Santa Clara Valley via San Jose to the vicinity of Milpitas where the line branches to San Francisco and to Oakland, Berkeley and San Pablo. A second line known as the Standard Pacific Gas Line also extends from the Kettleman Hills north to San Pablo via Tracy, Pittsburg, Martinez and Crockett.

The Pacific Gas and Electric Co. has branch lines from the "Stanpac" line to Stockton and Sacramento in the San Joaquin Valley and to Vallejo, Santa Rosa, San Rafael and other towns in Marin County, A pipeline also extends from Tracy Terminal to Milpitas Terminal with a regulator and metering station off this line serving Livermore and vicinity. The accompanying map shows the system mentioned above.

Patrol and maintenance stations are located at Buttonwillow, Kettleman Hills, Panoche Junction, Antelope, Hollister, San Martin, Newman, Tracy and Concord. At Kettleman Hills there is also the office of the field headquarters.

Measuring and regulating stations are located at Kettleman Hills, Milpitas Junction, Tracy Junction, Vernalis, Crockett and San Pablo.

A telephone line has been completed which runs parallel to the main pipeline system. The southern section extends from the Buttonwillow patrol cottage to the Kettleman office and another section leads from the Kettleman office back into the Kettleman Hills with a telephone installed in each gasoline absorption plant from which the company receives dry natural gas. Two circuits follow the pipelines as far north as Panoche Junction where they branch to follow the gas lines to Milpitas and Tracy terminals. A leased circuit connects Milpitas to the San Francisco office; a circuit was constructed from Tracy to San Pablo Terminal connecting to a leased circuit from the latter point across San Francisco Bay through a submarine cable to the San Francisco office. Proposed leads will be constructed between Tracy and Milpitas terminals and from Tracy to Stockton and Sacramento also following the pipelines in each case.

Twenty-five foot, 6-inch top, treated, cedar poles were used, being placed 24 to the mile. No. 8 bare copper wire was strung on brackets or eight-pin cross arms, depending upon whether there were one or more circuits on the poles. The Pacific Gas and Electric Co.'s standard scheme of transposition was used throughout the system, providing for transposing on an average of every seventh pole.

The ringing circuit was so arranged as to provide both metallic and simplex ringing. The latter is used only between terminals and prevents ringing of bells in the patrolmen's cottages except when patrolmen are being called, at which time the metallic circuit is used. This feature is very desirable since the telephone system is used day and night and would otherwise be disturbing to the occupants of the cottages.

Motor generator sets are used at the terminals for providing the ringing current. They were built up by the company's electricians and consist of 1/6 horsepower 110-volt 60-cycle single phase AC motors driving two six-bar generators. Hand generators are of course used in the telephones along the line, and can be rung either simplex or metallic.

*Fred F. Doyle*

Portable telephones or "test sets" are provided all superintendents, foremen, and repairmen. They are equipped with 2500-ohm bells, five-bar generators and are wired to ring as either simplex or metallic.

At the Kettleman Hills office a switchboard with contacts for 16 circuits has been provided, the switching between circuits being done by the use of keys. At the present time the Buttonwillow and Kettleman field circuits, the two circuits leading north and two local circuits terminate on that board so that any pair can be interconnected.

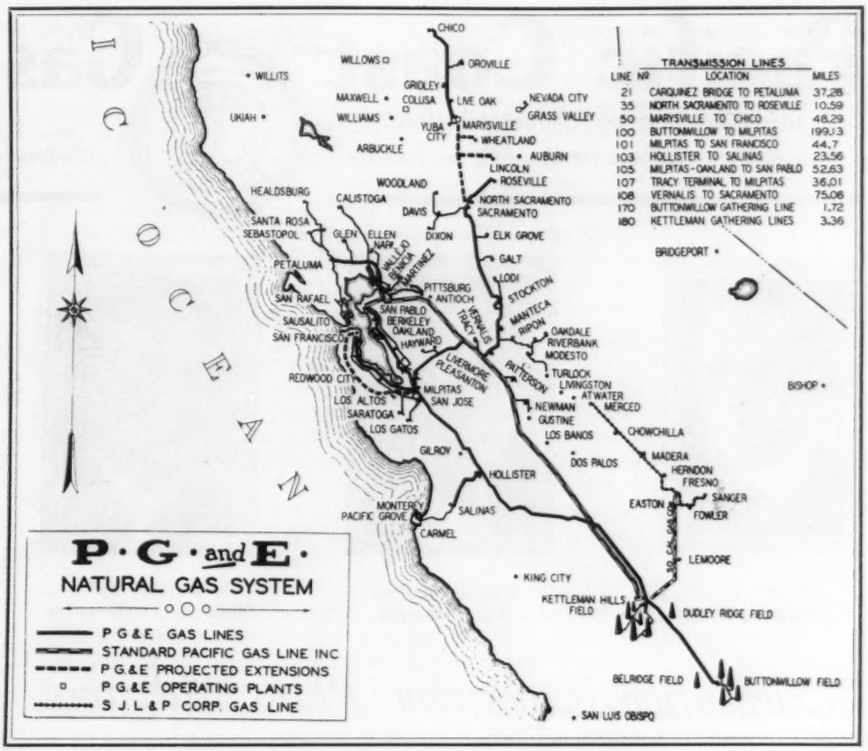
Similar boards, taking care of eight incoming circuits, are provided at Milpitas and Tracy terminals. At each place a hand generator is provided for use should the motor generator set be out of order.

At all telephones where there is more or less noise or where operators to be called are often outside of the office, 110-volt Howlers have been installed. Drops housed in conduits with fuses and switches have been placed on all poles close to valves in the pipe line for use in case of the necessity for operat-

# Dispatching *the* System

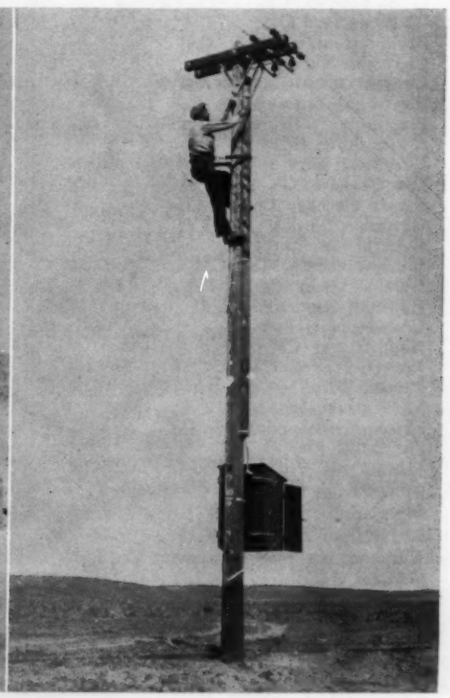
*By* FRED F. DOYLE

*Manager, Natural Gas Division*
*Pacific Gas and Electric Company*




ing the valves and for repairmen while out on the line to report to one terminal or the other. Similar drops are provided on poles at all main road crossings for the convenience of those operating the line to call in when desired or necessary.

Provision is made at all patrol stations, and also at various convenient points along the line, for sectionalizing or separating the line. This feature is a great aid in locating trouble on the circuit such as a short or break, as by sectionalizing and calling or listening both ways the direction and approximate location of the trouble can be ascertained, thus saving considerable time and useless miles of driving. An accompaning illustration shows the equipment on a pole where the line can be sectionallized; another shows a patrolman using a portable telephone at one of the drops near a main pipe line valve.



*AT LEFT: Using portable telephone on P. G. and E. Co.'s natural gas division telephone system. Emergency pipe shown at foot of pole. (30-foot joint is spotted every 5 miles along the line.) AT RIGHT: Sectionalizing pole on the company's natural gas division telephone system.*

At stations where there are two or more cottages a telephone is placed in each house, with a switch in one house—usually that of the foreman or head repairman—the wiring being so arranged that any one can be switched on to be called in case of the absence of the one in charge. Only one telephone at a station is across the line at one time, thus reducing the load on the circuit.

The gas dispatching organization consists of a chief gas dispatcher and three shift dispatchers located at San Francisco, in what is known as the gas control office; three operators (one for each eight-hour shift) at the Milpitas terminal and at the Tracy terminal; a head field operator at Kettleman Hills, with three shift operators. Relief men are employed to allow each operator one day off in each seven. At the Vernalis, Crockett and San Pablo regulator and metering stations only one man is employed, the work not requiring active duty each hour of the day.

The gas control office in San Francisco is provided with a large map covering the wall for the entire length of one side of the room. This map shows in heavy colored lines the location of the company's pipe line system and also other companies' lines which connect to it. For each valve there is a colored pin, green denoting the valve as being open

*(Continued on Page 62)*

# Pacific Coast Gas Association

Managing Director: Clifford Johnstone

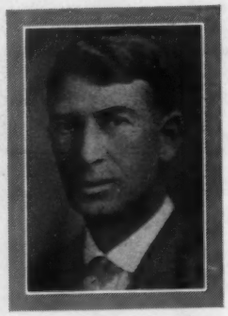
Association Headquarters: 447 Sutter St., San Francisco

President: R. E. Fisher

Vice-President, Pacific Gas and Electric Co., San Francisco

*H. M. Crawford*
*Exposition Chairman*

*Van E. Britton*
*Entertainment*



*W. S. Yard*
*Hotel Accommodations*

## *Convention-Exposition Plans Advance*

WHILE two months time still must elapse before Convention time, interest is already running a temperature. That it will be the first convention to be held in San Francisco since 1915 adds a zest to the event, and the Natural Gas Exposition is acquiring an importance that will overshadow anything ever before attempted by the industry.

Of immediate interest to all members is the announcement of John P. Coghlan, General Convention Chairman, that practically all Convention activities will take place in the Civic Auditorium and that therefore no official hotel will be designated. W. S. Yard, in charge of Hotel Accommodations, will select a number of leading hotels, and their rates and location with respect to the Auditorium, will be published in a circular sent to members early in August. The hotel list will no doubt include such favorites as the Bellevue, Clift, Fairmont, Mark Hopkins, Palace, Saint Francis, Sir Francis Drake, Stewart, Whitcomb and William Taylor. All reservations will be made through the committee.

Other committees are striving to make the Convention a memorable one. Every effort will be made to publish a tentative program in the August *Western Gas,* which also will include the majority of the year's committee reports.

H. M. Crawford, chairman of the Natural Gas Exposition, and Geo. P. Egleston, Director of Exhibits, report excellent progress. A scheme of decoration has been selected which will transform the vast main hall of the Auditorium into a colorful and modernistic scene in which the blues, oranges and reds of flame will predominate. The exhibition space has been taken up very rapidly, the list of exhibitors including the following firms:

American Cast Iron Pipe Co.
American Gas Furnace Co.
American Radiator Co.
American Stove Co.
T. G. Arrowsmith Co.
C. B. Babcock Co.
H. R. Basford Co.
Bryant Heater & Mfg. Co.
Chapman Valve Mfg. Co.
Clow Gasteam Heating Co.
Electrogas Furnace Co.
Electrolux (California Servel, Inc.)
Estate Stove Co.
Everhot Heater Sales Co.
Fox Furnace Co.
Fraser Furnace Co., Inc.
Gaffers & Sattler
General Gas Light Co.
James Graham Mfg. Co.
Hammer Bray Co.
Hoffman Heater Co.
Homestead Heater Co.
Hoyt Heater Co.
Jas. H. Knapp Co.
Lennox Furnace Co.
McEverlast, Inc.
Merco Nordstrom Valve Co.
Lee B. Mettler Co.
Minneapolis Honeywell Regulator Co.
Moore Bros. Co.
Mueller Co.
L. J. Mueller Furnace Co.
National Welding Equipment Co. Ltd.
Natural Gas Bureau of Los Angeles
Natural Gas Equipment Co. Inc.
Northwest Gas & Electric Equipment Co.
Pacific Gas and Electric Co.
Pacific Gas Heating Co.
Pacific Meter Works.
Payne Furnace & Supply Co., Inc.
Petroleum Heat & Power Co.
Pittsburg Water Heater Co.
Pittsburgh Equitable Meter Co.
Reliance Manufacturing Co.
Ruud Mfg. Co.
Sprague Meter Co.
Steiger & Kerr Stove & Foundry Co.
Tappan Stove Co.
A. F. Thompson Mfg. Co., Inc.
Wailes Dove-Hermiston Corporation.
Walworth California Co.
Welsbach Co.

## *Industry Mourns Passing of C. H. Dickey*

CHARLES H. DICKEY, born January 9, 1860, at Baltimore, Maryland, passed away on June 17, 1931 at his country place "El Deseo" at Del Monte, Calif., at the age of 71 years.

Mr. Dickey is survived by his widow, Araminta Duvall Dickey, and six children. Of the four daughters three reside in the East and one in California. The two sons are Charles H. Dickey, Jr. and William Duvall Dickey, manager of the Pacific Meter Works.

*Charles H. Dickey*

Charles H. Dickey as a boy attended the public schools at Baltimore, entering the Loyola College in the same city and later attending Muhlenburg College located at Allentown, Pa. When only 17 years of age he showed a marked interest in the possibilities of the gas meter business and entered the employ of the Dickey Tansley Company of Baltimore, of which firm his father, Charles E. Dickey, was a member. The Tansley interests were bought out about 1879 and Charles E. Dickey formed a company by that name, later changing the name to the Maryland Meter Company. Charles H. Dickey's permanent connection with the Maryland Meter Company began in 1880 and early in 1882 he was taken in with his father as junior partner in a newly formed partnership. It was in this year that Mr. Dickey was married to Araminta Duvall. It was Charles H. Dickey's interest in the manufacture of gas meters that was the direct cause for the development of the

## *Report of the Nominating Committee*

THE Nominating Committee of the Pacific Coast Gas Association has unanimously selected the following members for the various offices which will become vacant on September 30. These nominations will be made and the election held at the Convention meeting in the Civic Auditorium, San Francisco, on Tuesday morning, Sept. 1, 1931.

*For President:*

James L. Stone, Vice-President and General Manager, Spokane Gas & Fuel Co., Spokane, Wash.

*For Vice-President:*

Harry L. Masser, Vice-President and Executive Engineer, Los Angeles Gas & Electric Corp., Los Angeles, Calif.

*For Treasurer:*

D. G. Martin, Auditor, Pacific Gas and Electric Co., San Francisco, California.

*For Director (two year term):*

F. M. Banks, General Superintendent of Sales, Southern California Gas Company, Los Angeles, California.

A. E. Holloway, Commercial Manager, San Diego Consolidated Gas & Electric Company, San Diego, California.

W. C. Hornberger, Vice-President and General Manager, Arizona Edison Company, Phoenix, Arizona.

J. B. Wilson, President, Coast Counties Gas & Electric Company, Santa Cruz, California.

Respectfully submitted,

*Nominating Committee.*

Addison B. Day, Los Angeles;
Andrew Kerr, San Francisco;
C. W. Platt, Portland;
A. L. Spring, Los Angeles;
P. M. Downing, San Francisco, Chairman.

Maryland Meter Company and he was greatly instrumental in bringing about the consolidation of several gas meter manufacturers into forming the present American Meter Company in 1896.

At this time Charles E. Dickey retired and his son became the manager of the Maryland Meter Works and a director of the American Meter Company, continuing in this capacity until 1914. As a result of the death of John D. McIlhenny, Sr., the first president of the American Meter Company, Charles H. Dickey was elected to succeed him on November 21, 1911, retaining this position for many years.

While serving in this capacity Mr. Dickey conceived the formation of the Pacific Meter Works as a Pacific Coast branch of the American Meter Company, and the Pacific Meter Company became an actuality on June 1, 1921. Mr. Dickey resigned as president of the American Meter Company on October 17, 1923, and was elected to the chairmanship of the board of directors, also to serve as manager of the Pacific Meter Works of San Francisco and Los Angeles, Calif. Mr. Dickey served in these capacities until his retirement from active business on April 20, 1927, rounding out more than 45 years in the gas meter business.

Mr. Dickey's keen foresight and tremendous business energy was not only apparent in the growth and success of the American Meter Company but was also evident in other phases of our industry. In the early years of the present Baltimore Consolidated Gas, Electric Light and Power Co. Mr. Dickey assisted in the reorganization of the company with excellent results, serving for many years as a director and member of the executive board until moving from Baltimore to New York to assume the presidency of the American Meter Company.

While residing in New York and Atlantic City, New Jersey, Mr. Dickey was prominently connected with the Kings County Lighting Company.

For many years Mr. Dickey had maintained an interest in public utilities upon the Pacific Coast and was closely connected with Ferdinand R. Bain in the consolidation of the various small gas utilities to form the Southern Counties Gas Company in Southern California. Mr. Dickey served for many years as a vice-president of that company and after taking up his residence in California in 1921 became strongly affiliated with the Pacific Lighting Corporation and the Pacific Gas and Electric Company, serving as a director for both of these companies until the time of his death.

Throughout his entire business career Mr. Dickey was active in Association work, being for many years a director of the American Gas Association and serving as president of the Pacific Coast Gas Association during the year 1929-30. He served as toastmaster at many of the functions and was exceedingly popular with his fellow members. His magnetic personality, his forceful character and his loyalty to the gas industry all served to give him a place of leadership in the industry in which he will be sadly missed.

# *Reviewing the Northern Conference*

WITH representatives present from all gas companies in British Columbia, Washington and Oregon, the annual Northern Conference of the Pacific Coast Gas Association, held in Tacoma on June 11 and 12, proved to be a most interesting and profitable meeting. Especially noteworthy was the cordiality of the greeting given everyone by the Washington Gas & Electric Co., which as the host company, arranged a splendid program of entertainment to fill in the hours when meetings were not in session. At the closing meeting the conference expressed its appreciation in a vote of thanks to C. Y. Bowers, R. W. Coblentz and their co-workers.

In the absence of President R. E. Fisher, Vice-president James L. Stone presided at the meetings.

### *Natural Gas Situation In Northwest*

In discussing the prospects of discovering an economical source of natural gas for the Pacific Northwest, J. S. Holt, engineer of operations for the Seattle Gas Co. was frankly optimistic. He stated that a supply of one hundred million cubic feet per day would be necessary for the present population. Existing sources of such a volume in Alberta and California are so distant as to make the investment prohibitive at present. The hope of natural gas lies in discovering an adequate local supply. Considerable prospecting has been done in Washington, but practically all attempts have been meagerly financed and no great depth reached.

### *Air-Butane Operations*

While natural gas has yet to be discovered in quantity in the Northwest, the Natural Gas Corporations of Oregon and Washington have pioneered the introduction of a natural gas derivitive —butane. A. E. Strong, general manager of these companies, described the general physical and economic features of the 10 plants now in operation in Washington and Oregon. The plants produce a 550 B.t.u. air-butane gas; they are entirely automatic and contain many unusual and ingenious features requiring only occasional attendance and ordinary maintenance.

*Delegates gathered in Tacoma, Wash., for sessions of the annual Northern Conference of the Pacific Coast Gas Association.*

*Adaptation of Appliances to Air-Butane Mixture*

An interesting report prepared by F. M. Cota, C. E. White and W. E. Daynes of the San Diego Consolidated Gas & Electric Company, was read before the Technical Section. The report described tests on appliances designed and adjusted for a 550- B.t.u. manufactured oil gas when connected to a supply of 550 B.t.u. air-butane mixture. In general it was found that gas ranges are adaptable to the air-butane mixture with but little adjustment as are water heaters using screen burners. Other appliances were found which required radical change in the burner design. This paper appears in the current issue of *Western Gas*.

*Public Relations*

Vice-President James L. Stone gave a very interesting account of the educational and social activities of employees of the Spokane Gas & Fuel Co., which have led to the building of an unusually efficient and loyal organization. Geo. L. Myers, assistant to the president, Portland Gas & Coke Company, and chairman of the Association's Public Relations Section, described in some detail the ambitious program of educational and inspirational work being conducted by the Section, some features of which will be completed at the Convention but including many activities which will require years of continuous effort. F. H. Holden, supervisor of advertising and publications of the Southern California Gas Co., of Los Angeles, delivered an inspiring address leading to the conclusion that public utilities as at present organized under private ownership more nearly comply with the basic requirements of a democracy than does any type of government ownership or control.

Miss Clarita Scott, personnel assistant, Los Angeles Gas & Electric Corp. and chairman of the Association's Women's Committee, in addition to reading a comprehensive paper stressing the importance of suitable personnel activity in large and small companies, conducted a well attended meeting of women at which the problems of conducting company women's committee work was discussed.

*Advertising and Publicity*

Adequate publicity and advertising by the gas company was stressed by a number of speakers. W. D. Thurber, advertising manager of the Southern Counties Gas Co., Los Angeles, described a cake-baking contest among high school girls which became so popular that it outgrew his company's territory and finally resulted in a Southern California championship which movie fans the country over will see and hear in the news reels. The element of success in the plan was careful supervision and the elimination of anything which could lead to a charge of commercialism. Jas. F. Pollard, general manager of the Seattle Gas Co., illustrated by examples of advertising from his own and other companies, what is to be accomplished by advertising. J. Chas. Jordan, chairman of the Association's Cooperative Advertising Committee, showed slides of the copy prepared by his committee and also illustrated and discussed the advertising of his own company, the Pacific Gas and Electric Co. Alma Freeberg, director of the News Bureau of the Standard Management and Operating Corp., gave a most interesting account of the detail of her work in issuing news items and publicity to newspapers in the territory served by Pacific Public Service Co., subsidiaries in Washington, Oregon and California.

*Selling Gas By B.t.u's.*

An interesting study was presented by Claude Webber, superintendent of the gas department, Tucson Gas, Electric Light & Power Co. Mr. Webber pointed out the disadvantages of selling gas by the thousand or hundred cubic feet and advocated a unit of 34,100 B.t.u. equalling 10 kilowatt hours. This would permit of a direct cost comparison with electricity.

*Sales*

The keynote of modern thought among progressive sales managers was struck by A. A. Salmon, new business manager of the Spokane Gas & Fuel Co. who advocated better planning and a sounder foundation of knowledge of local, economic and business conditions in the guidance of a sales department. Along this line, R. L. Eltringham, special representative of the Pacific Gas and Electric Co., presented a paper describing some of the minor problems of a commercial department, among them being accidents to the public and their prevention, standardization of service, gas appliance ordinances and the problems arising from active dealer cooperation.

Other features of the program included talks by D. J. Young and Capt. A. E. Higgins, field representative of the American Gas Association, and a number of technical reports which will be printed in full in the August issue of *Western Gas*. The only poorly attended meeting of the entire conference was the Accounting Section Round Table. The Association urges that member companies give greater support to the Accounting Section activities. These cover a wide range of extremely technical and detailed studies which are in the need of standardization, which can result only from inter-company conferences.

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## New Business Dept. Organized; Ray C. Finch Placed in Charge

Northwest Cities Gas Co., Walla Walla, Wash., has organized a new business department, placing Ray C. Finch in charge. Mr. Finch was formerly with the Seattle Gas Co., and previous to that time was with Portland Gas & Coke Co.

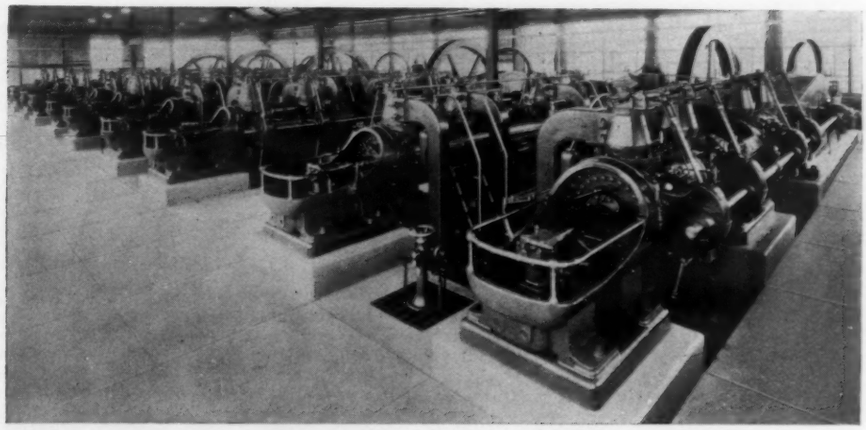
Mr. Finch will have charge of appliance sales, campaigns and advertising, and will cover the territory of the company which includes Lewiston, Idaho; Walla Walla and Yakima, Wash.; Pendleton, Astoria, Eugene, North Bend and Marshfield, Ore. H. M. Thomas is general manager for the company.

# Compressor Station Construction 1930-1931

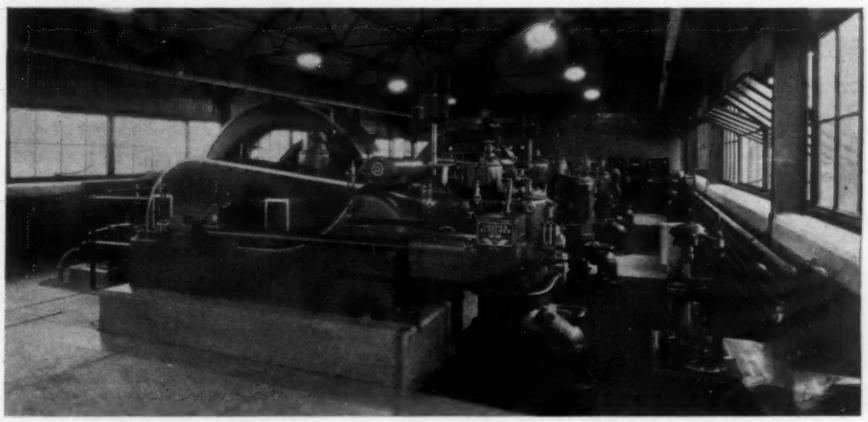
THE curve of compressor station construction has taken a decided upward trend during the past 12 months, following closely on the heels of major pipe line development. With construction begun and completed within the period on three large diameter lines from the Panhandle to points in the Middle West, and with a number of western companies extending their systems, it is only natural that compressor facilities should grow in proportion.

Continental Construction Corp. building the Chicago line, has completed or is now constructing 10 stations with a total capacity of 74,500 B.h.p. Lone Star Gas Co., in charge of compressor station facilities for the Northern Natural line, completed three stations, two for Kansas Pipe Line and Gas Co. of 6,000 B.h.p. each, and one for Missouri Valley Pipe Line Co. of 5,000 B.h.p. Panhandle Eastern Pipe Line Co.'s construction program called for two stations, one of 4,000 and one 5,000 B.h.p., which were completed this year, and Western Gas Co. built four stations on its New Mexico-Arizona line, adding a total of 9,120 B.h.p. The Colorado Interstate Gas Co., following a program laid down in 1929, early in 1930 completed two stations of 5,000 B.h.p. each. Cities Service Gas Co. added four new compressor stations, one 5,000-, one 3,000- and two 4,000-B.h.p.

The table below reviews some of the principal compressor station activity throughout the West, listing stations completed in 1930, and 1931, and those now planned for erection this year.



*Among the major compressor construction programs has been that of Cities Service Gas Co. Here are shown two views of the company's new Blackwell, Okla., station, which contains five 1,000 B.H.P. Cooper-Bessemer units. The new Drumright station has four of the same type units*



*Two 190-B.H.P. Cooper-Bessemer gas engines generate auxiliary power at the Blackwell compressor station. The Drumright station has the same equipment.*

| *H. P* | *Location* | *Status* |
|---|---|---|
| **Arkansas Natural Gas Corp.** | | |
| 10,000 | Sterlington, La. | Completed, 1930 |
| **Cities Service Gas Co.** | | |
| 5,000 | Blackwell, Okla. | Completed, 1930 |
| 2,000 | Higgins, Texas | Added Units, 1930 |
| 2,000 | Corwin, Kan. | Added Units, 1930 |
| 2,000 | Matfield, Kan. | Added Units, 1930 |
| 2,000 | Pampa, Texas | Added Units, 1930 |
| 2,000 | Moreland, Texas | Added Units, 1930 |
| 4,000 | Drumright, Okla. | Completed, 1930 |
| 3,000 | Wichita, Kan. | Completed, 1930 |
| 1,000 | Petrolia, Kan. | Replaced Unit, 1931 |
| 4,000 | Sedalia, Mo. | Completed, 1930 |
| **Colorado Interstate Gas Co.** | | |
| 5,000 | Devine, Colo. | Completed, 1930 |
| 5,000 | Near Clayton, N. M. | Completed, 1930 |
| **Continental Construction Corp.** | | |
| 15,000 | Fritch, Texas | Under Construction |
| 6,250 | Gray, Okla. | Completed, 1931 |
| 6,250 | Bloom, Kan. | Completed, 1931 |
| 6,250 | Heizer, Kan. | Completed, 1931 |
| 6,250 | Glasco, Kan. | Completed, 1931 |
| 6,250 | Beatrice, Nebr. | Completed, 1931 |
| 6,250 | Hastings, Iowa | Under Construction |
| 6,250 | Truro, Iowa | Under Construction |
| 6,250 | Harper, Iowa | Under Construction |
| 6,250 | Geneseo, Ill. | Under Construction |
| **Kansas Pipe Line & Gas Co.** | | |
| 6,000 | Calista, Kan. | Completed, 1931 |
| 6,000 | Abilene, Kan. | Completed, 1931 |
| **Lone Star Gas Co.** | | |
| 850 | Joshua, Texas (Eastland Station) | Completed, 1930 |
| 510 | X-Ray Station in Erath County | Completed, 1930 |
| 1,250 | Petrolia, Texas | Completed, 1930 |
| **Memphis Natural Gas. Co.** | | |
| | Near Memphis, Tenn. | Projected |
| **Missouri Valley Pipe Line Co.** | | |
| 5,000 | Clifton, Kan. | Completed, 1931 |
| **Montana Dakota Power Co.** | | |
| | Cabin Creek, Mont. | Completed, 1930 |
| | Baker, Mont. | Completed, 1930 |
| **North Cen'ral Gas Co.** | | |
| | Casper, Wyo. | Under Construction |
| | Guernsey, Wyo. | Projected |
| **Panhandle Eastern Pipe Line Co.** | | |
| 5,000 | Louisburg, Kan. | Completed, 1931 |
| 4,000 | Liberal, Kan. | Completed, 1931 |
| **Southwestern Light & Power Corp.** | | |
| 450 | Chickasha field | Completed, 1931 |
| **United Gas Corp.** | | |
| 3,000 | Goodrich, Texas | Completed, 1931 |
| 4,000 | Sterlington, La. | Unit Completed |
| 1,530 | Bruni | Under Construction |
| **Western Gas Co.** | | |
| 9,120 | Fort Bliss | Completed |
| Total | Sieria Blanca, Texas | Completed |
| | Near El Paso | Completed |
| | Near Gage, N. M. | Completed |

## New Business Dept. for Northwest States Utilities

ACCORDING to a statement released by C. B. Aasness, manager of Northwest States Utilities Co., Great Falls, the company has established a New Business Department in Great Falls with a corps of trained salesmen and heating engineers. Robert Naylor, formerly sales manager for the Montana Dakota Power Co. at Rapid City, S. D. has been placed in charge of natural gas sales, and James Philips, also of Rapid City, is heating engineer.

Mr. Aasness states that the new schedule of rates recently announced by Great Falls Gas Co., distributor of the gas, together with the new merchandising set up of Northwest States Utilities Co., will bring added load in Great Falls. The latter company sells gas wholesale to the Great Falls Gas Co.

Northwest States Utilities has leased a corner building in the down town section of the city, and opened an appliance display there on June 26, with a complete line of both domestic and industrial appliances. General offices of the company will also be moved to that location.

A special series of merchandising campaigns is being planned for the remainder of the year.

# New Gas Franchises

## 1930-1931

FURTHER widening of gas service area is indicated by the following tabulation of franchises granted during the 1930-31 period. This list completes the *Western Gas* New Gas Service Area Survey, the first part of which was published in the May Natural Gas Edition.

As revealed by companies reporting in this franchise survey, 132 towns and cities have granted franchises in 18 states, and some of the territory is being opened up for natural gas service for the first time.

Franchising activity is often a barometer of transmission line construction, and in many cases this list will foretell major pipe line construction soon to get under way. Especially is this true in the Utah-Idaho, Wyoming and Montana sections.

In the Mid-West area, franchising activity is centered largely around the newly completed cross-continent lines, with many towns yet to be served from these major carriers.

### Franchises Granted, 1930-1931

**(Service Not Yet Begun)**

| Company | Town | Population |
|---|---|---|
| **ARKANSAS** | | |
| **Cosden Oil Co.** | | |
| | Heber Springs | 1,400 |
| **CALIFORNIA** | | |
| **Pacific Gas and Electric Co.** | | |
| | Fowler | 1,171 |
| **West Side Natural Gas Co.** | | |
| | Kettleman City | 200 |
| **COLORADO** | | |
| **Eastern Colorado Gas Co.** | | |
| | Otis | |
| **Fred Haller** | | |
| | Mancos | |
| **A. A. Odlum** | | |
| | Craig | 1,418 |
| **Public Service Co. of Colorado** | | |
| | Brighton | 3,390 |
| | Fort Lupton | 1,559 |
| **IDAHO** | | |
| **Wasatch Gas Co.** | | |
| | Franklin | 531 |
| | Preston | 3,378 |
| | Downey | 553 |
| | McCammon | 467 |
| **IOWA** | | |
| **Council Bluffs Gas Co.** | | |
| | Glenwood | 2,000 |
| | Oakland | 2,000 |
| | Missouri Valley | 4,000 |
| **Iowa Electric Co.** | | |
| | Anita | 1,300 |
| | Casey | 1,000 |
| | Wiota | |
| **Northwestern Light and Power Co.** | | |
| | Alta | 1,195 |
| | Aurelia | 677 |
| **KANSAS** | | |
| **Gas Service Co.** | | |
| | Vesper | 162 |
| | Whiting | 351 |
| **Central States Gas Utilities Co.** | | |
| | Bucklin | 800 |
| **LOUISIANA** | | |
| **Louisiana Power & Light Co.** | | |
| | Ponchatoula | 2,898 |
| | Amite | 2,536 |
| | Covington | 3,208 |
| | Slidell | 2,807 |
| **MISSOURI** | | |
| **Central States Gas Utilities Co.** | | |
| | Tipton | 1,200 |
| | Houstonia | 500 |
| | Green Ridge | 400 |
| | Pilot Grove | 800 |
| | Clarksburg | 500 |
| | Centerview | 300 |
| | Meadville | 700 |
| | Laclede | 700 |
| | Bevier | 1,900 |
| | Callao | 600 |
| | Palmyra | 2,000 |
| **Gas Service Co.** | | |
| | Alma | 361 |
| | Emma | 167 |
| | Blackburn | 292 |
| | Waverly | 941 |
| | Norborne | 1,190 |
| **General Utilities Co.** | | |
| | Odessa | 1,861 |
| | Stewartsville | 600 |
| | Maysville | 1,100 |
| | Hamilton | 2,000 |
| | Parkville | 700 |
| | Cameron | 3,500 |
| | Lathrop | 1,200 |
| | Osborne | 400 |
| **Missouri Power & Light Co.** | | |
| | Centralia | 2,000 |
| | Farber | 436 |
| | Hallsville | 212 |
| | Laddonia | 576 |
| | New Franklin | 1,210 |
| | Sturgeon | 600 |
| **Western Service Corp.** | | |
| | Adrian | 934 |
| | El Dorado Springs | 1,917 |
| | Appleton City | 1,136 |
| | Deepwater | |
| **MONTANA** | | |
| **Billings Gas Co.** | | |
| | Bozeman | 6,855 |
| **Central Montana Utilities** | | |
| | Lewistown | 5,358 |
| **Lewistown Natural Gas Co.** | | |
| | Lewistown | 5,358 |
| **Montana Power Co.** | | |
| | Butte | 39,532 |
| | Deer Lodge | 3,510 |
| | Livingston | 6,391 |
| | Bozeman | 6,855 |
| | Butler | 2,706 |
| | Walkerville | 2,400 |
| **Public Service Gas Co.** | | |
| | Big Sandy | 600 |
| | Fort Benton | 1,100 |
| **NEBRASKA** | | |
| **Council Bluffs Gas Co.** | | |
| | Winnebago | 648 |
| | Walthil | 1,145 |
| | Lyons | 1,200 |
| | Rosalie | 500 |
| | Homer | 700 |
| **Natural Gas Distributing Co.** | | |
| | Lexington | 2,962 |
| | Nelson | 903 |
| **Public Service Corp. of Nebraska** | | |
| | Indianola | 800 |
| | Hershey | 500 |
| | Bartley | 300 |
| | Brady | 400 |
| | Arapahoe | 1,000 |
| | Sutherland | 800 |
| **Mid-West Natural Gas Co.** | | |
| | Albion | 2,172 |
| | Wayne | 2,381 |
| | Madison | 1,842 |
| | Winside | 500 |
| **Nebraska Natural Gas Co.** | | |
| | Schuyler | 2,588 |
| | Papillion | 700 |
| | St. Paul | 1,621 |
| **North Central Gas Co.** | | |
| | Scottsbluff | 8,465 |
| | Lyman | |
| **NEW MEXICO** | | |
| **Southern Union Gas Co.** | | |
| | Las Vegas | 7,500 |
| **NORTH DAKOTA** | | |
| **Montana-Dakota Power Co.** | | |
| | Minot | 16,099 |
| | Hettinger | 1,292 |
| | Kenmare | |
| **OKLAHOMA** | | |
| **Canadian Valley Gas Co.** | | |
| | Supply | |
| **Cimarron Utilities Gas Co.** | | |
| | Boise City | 1,256 |
| | Keys | 350 |
| **H. E. Dowd Gas Co.** | | |
| | Porum | 471 |
| **Junior Gas Co.** | | |
| | Heavener | 2,269 |
| | Howe | 692 |
| **Mulhall Gas Co.** | | |
| | Mulhall | |
| **Pact Gas Co.** | | |
| | Carney | 400 |
| **Oklahoma General Gas Co. & Pioneer Gas Utilities Co.** | | |
| | Jones | |
| | Spencer | |
| **Spiro Gas Co.** | | |
| | Red Oak | 600 |
| **State Fuel Supply Co.** | | |
| | Buffalo | 1,006 |
| **Western Service Corp.** | | |
| | Guthrie | 9,582 |
| **Wilson Brothers Gas Co.** | | |
| | Haskell | 2,632 |
| **OREGON** | | |
| ***Portland Gas and Coke Co.** | | |
| | Newberg | 2,949 |
| | Rex | 50 |
| **TEXAS** | | |
| **Gulf Cities Natural Gas Co.** | | |
| | Wooster | |
| **West Texas Gas Co.** | | |
| | Meadow | 350 |
| **Northwest Gas Co.** | | |
| | Menard | 1,200 |
| **E. P. Moseley** | | |
| | Port Lavaca | 1,250 |
| **UTAH** | | |
| **Wasatch Gas Co.** | | |
| | Willard | 651 |
| | Perry | 367 |
| | Brigham | 5,092 |
| | Wellsville | 1,298 |
| | Hyrum | 1,869 |
| | Logan | 9,969 |
| | Smithfield | 2,352 |
| | Richmond | 1,140 |
| | Lehi | 3,078 |
| | American Fork | 2,763 |
| | Pleasant Grove | 1,632 |
| **WASHINGTON** | | |
| **Northwestern Natural Gas Co.** | | |
| | Zillah | 1,000 |
| | Toppenish | 2,768 |
| | Wapato | 1,500 |
| | Pasco | 3,000 |
| | Kennwick | 1,600 |
| **WYOMING** | | |
| **North Central Gas Co.** | | |
| | Guernsey | 656 |
| | Douglas | 1,917 |
| | Lingle | |

*Manufactured Gas.

### Report 20-Inch, $14,000,000 Line for Western Service Corp.

According to late press reports, the Western Service Corp., Oklahoma City, is planning construction of a 20-inch natural gas transmission line from the company's holdings in the Oklahoma City field to Tulsa and from there to points north. It is reported that surveys for the line are being made, and that the estimated cost is $14,000,000. The company has applied for a franchise to serve gas in Shawnee, and it is believed that the line would pass through that city, should the franchise be granted.

### Western Service Corp. Begins Work at Guthrie

Work has begun on a $227,000 natural gas distribution system for Guthrie, Okla., which is being installed by the Western Service Corp. of Oklahoma City. The company expects to have the gas distribution system completed within 45 days from date work was started.

### Nemec Constructing Addition to Factory; Marketing New Burner

Fred A. Nemec, manufacturer of combustion engineering equipment, Whittier Calif., announces that he is constructing an addition to the factory, giving the company approximately double the present floor space.

The company has also placed on the market a new circular type multiple jet gas burner for round furnaces. It is a combination burner for gas and oil, and is furnished with automatic draft control if required.

### Central States Gas Utilities Ready to Serve Mid-West Towns

Central States Gas Utilities Co., subsidiary of Panhandle Eastern Pipe Line Co., Kansas City, Mo., is carrying on an extensive franchising program, with franchises recently granted in Tipton, Houstonia, Green Ridge, Pilot Grove, Clarksburg, Meadville, Laclede, Bevier, Callao and Palmyra, all in Missouri. The company recently began serving natural gas from the Panhandle Eastern Line in Macon and Windsor, Missouri, in addition to many towns and cities in Kansas, including the following: Arlington, Bloom, Burns, Elbing, Iuka, Kingsdown, Kismet, Langdon, Minneola, Mullinville, Preston, Turon and Whitewater. Bucklin, Kan., granted a franchise to the company late in May.

In the state of Illinois, the Panhandle Illinois Pipe Line Co., also a subsidiary of Panhandle Eastern Pipe Line Co., has been granted franchises in Glasgow, Rochester, and Mt. Auburn.

### G. M. Davidson Chief Engr. for Natural Gas Co. of America

Gordon M. Davidson, general superintendent of natural gasoline plants for the Empire Oil & Refining Co., has been named chief engineer of the Natural Gas Co. of America, Chicago, Ill.

Mr. Davidson is a graduate of Stanford University College of Engineering, and following a period of service with the American forces in France, he accepted a post with the Empire organization. Mr. Davidson's headquarters will be in Chicago.

Natural Gas Co. of America operates the 24-inch natural gas transmission line from Amarillo to Chicago, now being completed.

### Service Begun at American Fork by Wasatch Gas Co.

Natural gas service was begun in American Fork, Utah, on June 2 by the Wasatch Gas Co., headquartered at Salt Lake City. Service was expected to start during the month in Lehi and Pleasant Grove, according to a report credited to J. D. Roberts, vice-president of the company.

Dixon-Taylor Russell Co. has been appointed dealer for gas appliances in American Fork and Pleasant Grove by the Wasatch Gas Co.

## 1931 Calendar

**July**

*Home Service, Summer Course*—Columbia University and American Gas Association, at Columbia University, New York, N. Y., July 6-24, 1931.

*Southern California Meter Association*—July 23, 1931.

**September**

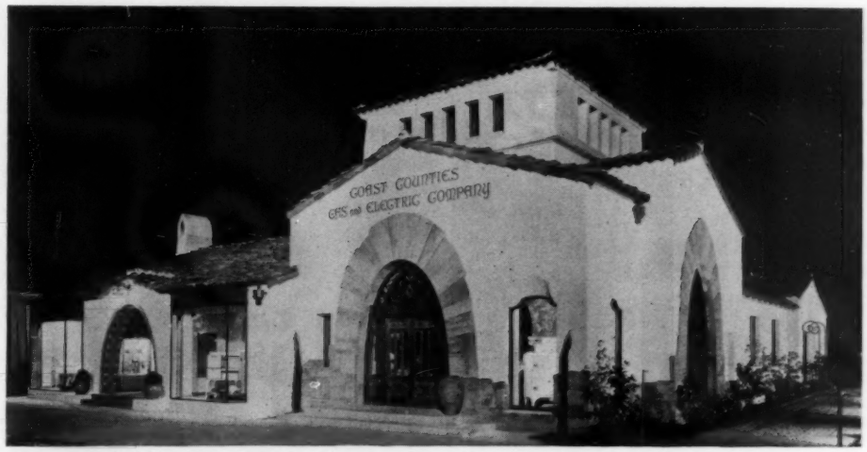
*Pacific Coast Gas Association*—38th Annual Convention, San Francisco, Calif., August 31 to September 5, 1931.

**October**

*American Gas Association*—13th Annual Convention, Atlantic City, week of October 12, 1931.

**November**

*Third Annual Conference on Bituminous Coal*—Pittsburgh, Pa., November 16-21, 1931.




*Night view of the new Coast Counties District office at Watsonville, Calif. Two large display windows and a small appliance display window are shown at the left entrance to the building.*

# Coast Counties New Watsonville Office

THE new Watsonville district office building of the Coast Counties Gas and Electric Co., of Santa Cruz., Calif., has just been completed at a cost of approximately $60,000. It is an attractive structure, both in design and decoration, and modern in every respect. Formal opening was held on June 6, with N. E. Paulsen, district manager for Coast Counties, in charge.

The building is L shaped, and covers an area 73 feet by 100 feet. The Spanish architectural motif has been carried out in every detail, with stucco walls, red tile roof, courts and archways.

The merchandise display room is 42 feet by 30 feet. The ceiling is rustic with concrete beams which have been stained to represent heavy timbers, and the entire ceiling is painted with an old Spanish design. The floor is concrete, squared and painted to represent red tile..

Directly off the main sales floor are two model kitchens, one entirely equipped with gas appliances and the other equipped with electric appliances. The gas kitchen contains a kitchen cabinet, full automatic hot water heater, gas range, and a gas refrigerator.

The building is heated and cooled by natural gas, and water for the entire building is heated by the two hot water heaters installed and connected in the gas and electric kitchens.

Another feature of the new office is the employee's meeting and conference room, which may also be used for demonstrations and cooking schools as there is a kitchenette adjoining, equipped with a hot plate, sink and cupboard space.

The building is flood lighted at night, with 10 lights along the driveway, seven on a pole diagonally across the street, one on the roof of a neighboring filling station, four on the north side of an adjoining building, and three on the back slope on the roof, playing on the tower over the display lobby.

A driveway enters the parking space in the rear of the building reserved for customers. Shrubbery has been planted along the edge of the drive and a rock garden constructed in the back.

Standard Management and Operating Corp., San Francisco, was in charge of the construction.

# North Central Gas Co. Line Progresses

RAPID progress is reported on the construction work of the North Central Gas Co. and New York Oil Co. in eastern Wyoming and western Nebraska. The North Central Gas Co. plans to serve gas from the old Teapot Dome oil line, now being reconditioned for natural gas service.

Distribution systems have been completed in all towns along the right-of-way in Wyoming, including Douglas, Guernesey, Ft. Laramie, Lingle, and Torrington. Construction has also started on the distribution systems in some of the towns on the Nebraska side. The distribution system at Morrill is well under way.

Pipe for the 18-mile lateral to Wheatland, Wyo., has been delivered, and construction was expected to start during the last week in June. The line will be of 4-inch pipe.

Work on the compressor station near Casper is also progressing satisfactorily, with one building completed and the foundation for the main building in place. All material for the stations has been delivered.

Stanolind Pipe Line Co. is reconditioning the line and reports that it has been cleaned and tested as far as Fort Laramie, Wyo.

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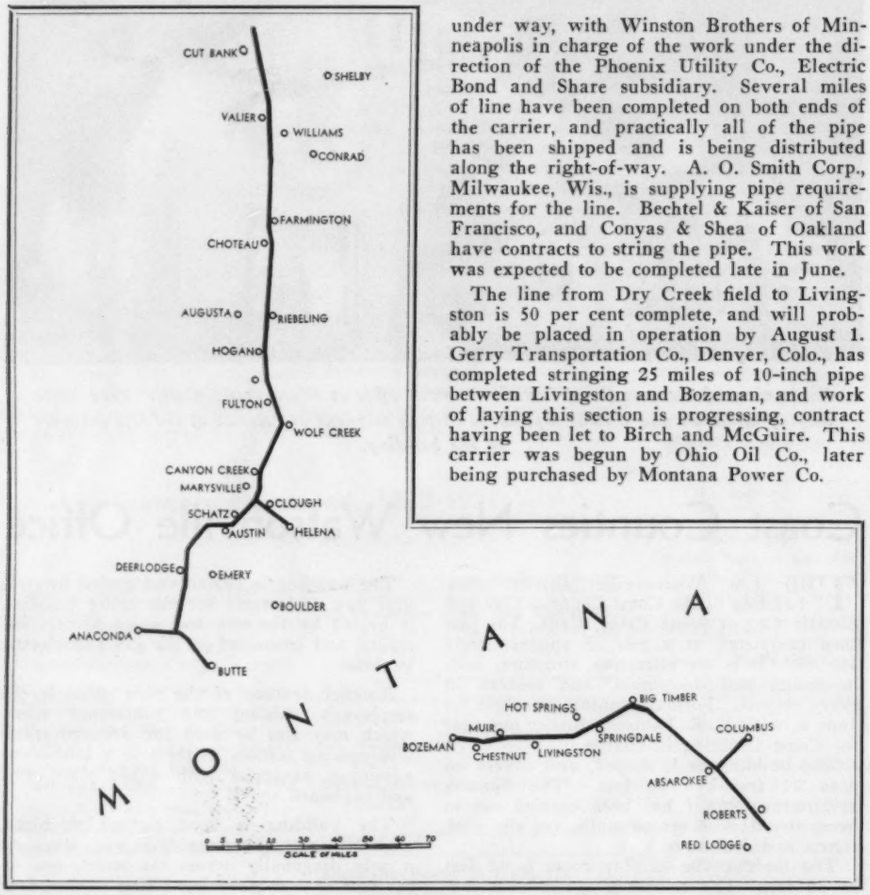
### Western Service Corp. Ready to Serve Butler and Adrian

Western Service Corp., Oklahoma City, constructing a line from eastern Kansas into Missouri, expected to begin serving Butler, and Adrian, Mo., late in June, according to press reports. The gas distribution system at Adrian has been completed. C. L. Berger Construction Co. is building the transmission line and distribution systems, and announces that work is practically complete on both.

# Montana Power Co.'s Line Makes Headway




*Sketch showing the route of Montana Power Co.'s new carriers, with some of the available markets. The line on the left extends from Cut Bank field to Helena, Butte, Deerlodge, Anaconda and other points, while the line on the right will serve Livingston and Bozeman and nearby communities from Dry Creek field.*

CONSTRUCTION of Montana Power Co.'s line from the Cut Bank field in northern Montana to Butte, Helena, Deer Lodge, Anaconda, and other cities is now under way, with Winston Brothers of Minneapolis in charge of the work under the direction of the Phoenix Utility Co., Electric Bond and Share subsidiary. Several miles of line have been completed on both ends of the carrier, and practically all of the pipe has been shipped and is being distributed along the right-of-way. A. O. Smith Corp., Milwaukee, Wis., is supplying pipe requirements for the line. Bechtel & Kaiser of San Francisco, and Conyas & Shea of Oakland have contracts to string the pipe. This work was expected to be completed late in June.

The line from Dry Creek field to Livingston is 50 per cent complete, and will probably be placed in operation by August 1. Gerry Transportation Co., Denver, Colo., has completed stringing 25 miles of 10-inch pipe between Livingston and Bozeman, and work of laying this section is progressing, contract having been let to Birch and McGuire. This carrier was begun by Ohio Oil Co., later being purchased by Montana Power Co.

When the two lines are complete there will remain only 85 miles between termini, and it is reported that the company plans to connect the two lines later.

# United's Louisiana Line Completed

NATURAL gas service was expected to begin in Lake Charles during the week of June 22-29 and will be introduced as rapidly as possible in more than 30 additional towns and communities in Louisiana along the new extension of the United Gas Public Service Co. pipe line from Kirbyville in East Texas to Franklin, La., according to an announcement from the general offices of the United Gas System in Houston.

The United Gas Public Service Co., chief operating subsidiary of the United Gas Corp., has purchased the gas distribution system of the Gulf States Utilities Co. in Lake Charles, which town has to date been served with manufactured gas. Lake Charles was the only city along the new extension to have manufactured gas, and the advent of "natural" in the other communities will provide a new type of fuel.

Lake Charles will serve as division headquarters for the United Gas Public Service Co., in operating its new properties. Temporary headquarters have been obtained, but the company soon will move into its own new building in Lake Charles.

The main line of the Louisiana project is 156 miles in length. Lateral lines off the main line total 264 additional miles. The sizes of pipe used vary from 14-inch to 2-inch. In addition to Lake Charles the new fuel will be available to the following:

DeQuincy, Crowley, Jennings, Kinder, Oberlin, Rayne, Sulphur, Welsh, West Lake, Broussard, Church Point, DeRidder, Elton, Oakdale, St. Martinsville, Vinton, Youngsville, Abbeville, Bunkie, Cheneyville, Erath, Franklin, Joanerette, LeCompte, Milton, New Iberia, Opelousas, Cottonport, Mansura, Marksville, Merryville and probably Breaux Ridge.

After the change-over from manufactured to natural gas is effected in Lake Charles, the towns along the main line between Lake Charles and Kirbyville will be given service. These are Sulphur, DeQuincy, Vinton, DeRidder and Merryville. Others will be added when city distribution systems are completed.

The Louisiana extension of the United Gas System's facilities was started in December, 1930. Construction crews were forced to contend with many obstacles in laying the pipe line through boggy rice fields and through dense Louisiana swamp lands. Often machinery became mired and ditching was done by hand labor.

A private telephone system will parallel the pipe lines which will bring gas from the Shreveport area and a reserve emergency supply from the south Texas fields. Work on the telephone system is well under way with portions of the line completed and in operation at the present time.

In addition to the fuel service for domestic and commercial consumption, the new extension will serve many Louisiana industries, among which are paper mills, sulphur mining operations, sugar refineries, lumber mills and salt mines.

## Name of The Saxtet Co. Is Changed to Republic Gas Corp.

Stockholders of the Saxet Co., headquartered at Houston, Texas, have voted to change the name of the company to Republic Gas Corp., to become effective on June 15.

The adoption of the new name was recommended by directors elected two months ago when control of the company was secured by the Moody-Seagraves interests and G. E. Barrett & Co., Inc. The company has since acquired proven gas reserves of approximately 340,000 acres in southwest Kansas and western Oklahoma, together with a contract for the sale of large quantities of gas to the pipe line system of Northern Natural Gas Corp., which will extend across Kansas and Nebraska to central and northern Iowa. This additional field of operation, in the opinion of directors, makes the original name—Texas spelled backward—no longer descriptive of the company.

O. R. Seagraves, vice-chairman of the United Gas Corp., will continue as chairman of the board of Republic Gas Corp. and Wm. F. Morgan as president.

## Western Public Service Co. Franchise Upheld By Idaho Supreme Court

The Idaho Supreme Court has upheld an order of the State Public Utilities Commission granting a certificate of necessity and convenience to L. B. Denning and John McFayden, representing the Western Public Service Corp. of Salt Lake City, Utah, affiliated with Mountain Fuel Supply Co. and Ohio Oil Co. These interests distribute gas in northern Utah from Wyoming gas fields.

Early in 1930 these companies sought to include southeastern Idaho in their system, and were granted permission to extend their lines to Pocatello, Idaho. The Public Utilities Consolidated Corp., of that city, protested and the matter has been in litigation. The plan now is to increase the pipe line and distribution system to include the cities of northern Utah and southeastern Idaho as far north as Pocatello. Officials of the company estimate that such extensions will cost in excess of $3,000,000.

No date has been set for the commencement of the construction work, but it is anticipated that it will be in the near future. The carrier will be about 100 miles long, with laterals serving towns off the route of the line.

### Community Natural Announces Several Personnel Changes

Several changes have been announced in the personnel of the Community Natural Gas Co. properties in Texas.

A. A. Johnston, formerly outside foreman for the company at Mexia, is now local manager in the Mexia district.

Pat E. Hodge has been named local manager in the Italy district, succeeding T. B. Stuart, resigned.

Clint L. Slover, formerly agent for the company at Marlin, has been transferred to the company's property at Wynnewood, Okla. Claude Reaves, formerly agent at Athens, has replaced Mr. Slover at Marlin. L. W. Ewing, formerly at Kaufman, succeeded Mr. Reaves at Athens, and Ross L. Dixon, formerly of Brownwood, replaced Mr. Ewing at Kaufman.

### Texas-to-Chicago Line Scheduled for Completion

Continental Construction Corp., now headquartered in the Chicago Civic Opera Building, Chicago, Ill., announces that all main line work on the company's Texas to Chicago carrier is complete, with the exception of 100 miles in Illinois, with July 15 set as the date for completion of that section. Five of the company's main line compressor stations have been completed, with five more nearing completion stages.

Construction work in the Chicago metropolitan area is being carried on by The Peoples Gas Light & Coke Co., and the new distribution system is practically complete, with change-over operations expected to start some time during the middle of July.

### Mason City Changed Over to Natural; More Extensions Planned

Following the completion of the Missouri Valley Pipe Line Co.'s line from Council Bluffs to Mason City, Iowa, company engineers are making a survey of towns in the vicinity of the line.

Mason City received its first natural gas in May, with 4,400 residences changed over by the Peoples Gas & Electric Co., formerly serving manufactured gas in that city.

Iowa Nebraska Light & Power Co. will retail the gas in the towns being surveyed along the route of the line. This company is also completing a line from the Lincoln-Sioux City extension in Nebraska, to serve West Point, Scribner, Dodge, and Hooper.

### 84-Mile Line From Jackson Field to Magnolia Completed

Mississippi Industrial Gas Co., Jackson, Miss., recently completed an 84-mile line from the Jackson field to Magnolia, Miss. The line was built and is being operated by this company. There is some possibility of continuing the line to Hammond, La., but the company is not ready to make a definite announcement to that effect.

### E. G. de Coriolis to Superintend Burner Installation at Smelters

E. G. de Coriolis, representing the Surface Combustion Co., Toledo, Ohio, has been employed by the Western Gas Co., El Paso, Texas, to cooperate with the Arizona smelters in installing burner equipment called for by the current change-over to natural gas fuel.

### Council Passes Vinita Franchise

The city council of Vinita, Okla., has adopted an ordinance granting a gas franchise to the Vinita Fuel Co.

*Battery of 23 ranges with contestants going into action in the finals of the Southern California cake baking contest.*

## Finals Held in So. Calif. Cake Baking Contest

A SERIES of cake baking contests inaugurated by the Southern Counties Gas Co. in its territory, culminated at the Shrine Civic Auditorium in Los Angeles on Saturday, June 6, when 23 high school champion cake bakers competed for gold and glory in an all Southern California cake baking tournament, conducted under the auspices of the National Business and Professional Women's Club of Los Angeles.

Each contestant was given the free use of a range of her own selection, and each chose a natural gas range.

A committee of well known domestic science experts headed by Mrs. Kate Brew Vaughn, director of the domestic science department of the Los Angeles Evening Express, judged the cakes and awarded first prize to Mary Julia Bell, 18-year-old cake baking champion, of Fullerton Union High School.

In being acclaimed first prize winner, Miss Bell received $50 in gold and a succession of honors bestowed upon her in her home city of Fullerton and throughout Southern California.

During the entire contest news-reel cameras clicked and a complete picturization of the event was made in sound motion pictures.

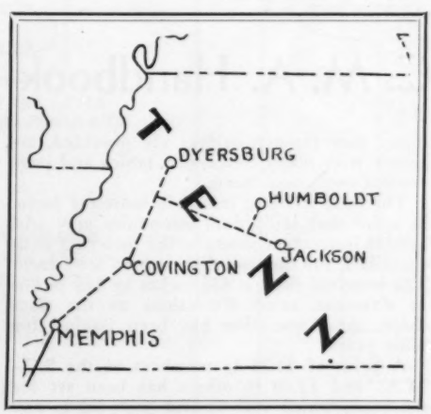
Approximately 3,000 girls participated in the preliminary contests, and from this group 23 champions were chosen to represent the various schools at the final championship tourney in Los Angeles.

The preliminary contests in Southern Counties Gas Co. territory were staged under the direction of W. D. Thurber, advertising manager of the company, who also was of considerable assistance to the Business and Professional Women's organization in conducting the championship cake baking tournament in Los Angeles.

## Memphis Natural to Begin Jackson Extension

WORK of extending the main pipeline of Memphis Natural Gas Company, affiliate of Appalachian Corporation, from Memphis to Jackson, Tenn., was scheduled to commence late in June and is due for completion in September. The new extension will be approximately 100 miles long, and will serve territory in western Tennessee, through arrangements with West Tennessee Power and Light Co., subsidiary of National Power and Light Co., affiliated with Electric Bond and Share Co.

Among the cities to be served are Jackson, Brownsville, Ripley and Covington, each with industrial plants offering a ready market for natural gas, aside from the domestic and commercial load. The Memphis-Covington section of the line is due for completion by August 1 and the entire line by September 15. A new compressor station is to be erected on the outskirts of Memphis, scheduled to be in operation by October 15. The company already has compressor stations at Guthrie, La., and Benoit, Miss.




*Route of the extension now being constructed by Memphis Natural Gas Co. in western Tennessee.*

### Service Begun at Brighton

Natural Gas service was begun in Brighton, Colo., early in June through a 24-mile line constructed by the Public Service Co. of Colorado, Denver.

# MEASUREMENT and CONTROL

## Officers Elected for 5th S. C. M. A. Year

*Outgoing S.C.M.A. officers and committee chairmen were presented with small charms, in the form of straight edge orifice plates, illustrated at the left.*

BRINGING to a close the fourth year of its successful service in the cause of better measurement practice, the Southern California Meter Association met on June 25 to elect a new panel of officers and committee chairmen, comprising the 1931-1932 board of directors. The meeting took place at Long Beach, at the Breakers Hotel, with a program and business session following the dinner.

To head the S.C.M.A. for the coming year, the Association selected **P. W. Hill** of the General Petroleum Corp., who for the past 12 months has served effectively as chairman of the program committee. The complete personnel of new officers and committee heads is as follows:

*P. W. Hill*

*President:* P. W. Hill, General Petroleum Corp.

*Vice-President:* L. P. W. DesBrisay, Los Angeles Gas and Electric Corp.

*Secretary:* G. S. Duncan, General Petroleum Corp.

*Treasurer:* A. E. Madden, Southern Counties Gas Co.

*Program Committee:* H. M. Dwight, Southern California Gas Co., chairman.

*Standards Committee:* M. W. Adcock, Union Oil Co., chairman.

*Entertainment Committee:* E. Lorenz, Southern California Gas Co., chairman.

*By-Laws Committee:* L. Bonner, Standard Gasoline Co., chairman.

*Publications Committee:* G. H. Finley, *Western Gas*, chairman.

*Membership Committee:* W. A. Spencer, Southern Counties Gas Co., chairman.

Voting was by unanimous ballot, following the reading of nominations by B. M. Laulhere of the nominating committee. The latter committee, appointed several weeks ago by President B. G. Williams, was made up of the following: T. K. M. Smith, chairman; R. F. Angell, R. L. Cook, B. M. Laulhere, G. B. Reece.

After the elections, which came at the close of the business session, President Williams officially introduced the new administration and turned the gavel of office to President-elect Hill.

As an evidence of appreciation for the time and enthusiasm given to Association projects during the past year, members of the outgoing board of directors were presented with small orifice plate charms by the S.C.M.A. Past Officers Club. B. M. Laulhere, a past-president of the Association, was spokesman for the presentation. The Past Officers Club is an informal group organized several months ago to further Association enterprises wherever possible.

The small charms given the outgoing board members are miniatures of a straight edge orifice plate, with a counter bore on each side. They were made for the Association through the courtesy of Col. George Sydney Binckley, in the latter's laboratory.

A much enjoyed feature of the June meeting was a mock-serious paper on phases of the measurement problem, by D. A. Stocks of the Richfield Oil Co. The speaker apparently spoke from a background of experience in his subject, and delivered the paper ably with the aid of slides.

Golf awards for the May tournament were announced at the June meeting, the S.C.M.A.-*Western Gas* Goodfellowship Trophy going to George H. Christen of Westcott & Greis, Inc. C. A. Wheeler, of the Robinson Orifice Fitting Co., won second prize, and H. C. Dahl of the Fisher Governor Co., third prize.

## Progress Made on S. C. M. A. Handbook

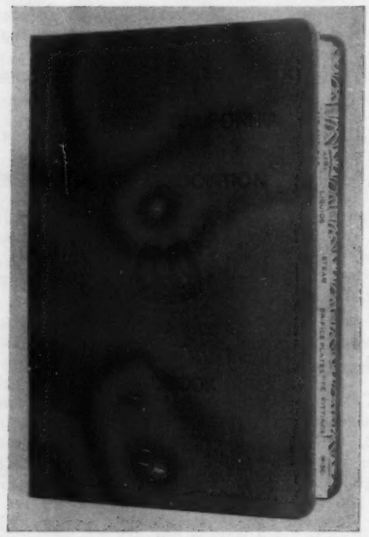
ABOVE is illustrated the cover of the "S.C.M.A. Handbook", preparation of which was recently authorized by the Association. The Handbook, it is felt, will fulfill a long standing need for a convenient sized permanent reference book, arranged for field and desk use.

As announced last month, the Handbook is looseleaf in form, with stiff canvas cover, tabs being provided to indicate the principal divisions of metering data—tables, air and gas, liquids, steam, orifice plates, pipe fittings, etc. Its contents are taken largely from data sheets and papers published by the Southern California Meter Association during the past four years. All essential tables and charts for the computation of air, gas, steam and liquid flow through orifices are provided, together with many conversion tables and convenient correction charts.

The book is being issued in looseleaf form, in order that individual companies may add special instruction sheets to the metering data contained, for the use of their own metermen. The looseleaf sheet is 6¾ inches by 3¾ inches in size—the same dimensions as the data sheets the Association has been issuing for some years.

A price of $1.75 to members of the S.C.M.A,. and $2.00 to others has been set for the book, which will be sent postpaid to any point in the United States or Canada. For foreign mailing a slight additional charge will be made. Orders may be placed with the Southern California Meter Association, Box 1100, Station C, Los Angeles, Calif.

A committee consisting of R. F. Angell T. K. M. Smith, W. L. Cowan, and W. J. Kennedy is directing the preparation of the Handbook for the S.C.M.A.



*Front cover of the Southern California Meter Association's new handbook for metermen, containing essential reference data on measurement.*

### Dominion Gas Meter Co., Ltd., Incorporated at Victoria, B. C.

The Dominion Gas Meter Co., Limited, 328 Wortley Road, London, Ont., and 2nd Avenue and Alberta Street, Vancouver, B. C., was recently incorporated under the extra-provincial companies act at Victoria, B. C. The firm is capitalized at $336,100 paid up capital, and carries on business as manufacturers of gas meters and gas company supplies.

### Southern California Gas Co. Extending Service Area

The Southern California Gas Co., Los Angeles, has just completed a main line extension at Manhattan, Calif., which adds 100 new consumers to the lines, and is constructing an 8-mile extension from its main line to serve Chatsworth, Calif.

### Service for Rockwell City Early in Summer

Iowa Public Service Co., Sioux City, Iowa, is constructing a distribution system at Rockwell City, with service expected to begin some time in the early summer.

### North Central Gets Lyman Permit

Lyman, Neb., has granted a franchise for the service of natural gas to the North Central Gas Co., Casper, Wyo. Supply will come from the Teapot Dome oil carrier, now being reconditioned for natural gas.

# The Design and Operation of Pressure Regulators

*By* Louis H. Brendel
*Neilan Co., Ltd.**

THE subject of pressure regulation and control is a very old one. Many of the basic principles herein reviewed form the foundation upon which the present day highly sensitive regulators are built. It is therefore necessary to investigate thoroughly these fundamentals in order to understand why a pressure regulator is built like it is, and why, as a result, it functions as it does.

Regulation is based on cold logic and each problem has its special circumstances that must be weighed before a decision is reached.

Practically all pressure regulators utilize the principle of a flexible diaphragm, upon one side of which the controlled pressure exerts its force while this force is opposed by various mechanical means acting on the other side of this diaphragm and in the opposite direction.

The majority of modern sensitive regulators employ springs, either singly or in multiple nests to oppose the fluid pressure on the diaphragm. Earlier types of regulators made use of the force of gravity to supply resistance to the force of the controlled pressure acting on the diaphragm. (Fig. 1). The simplest of these gravity regulators is the "dead end" type in which metal weights are piled on top of the diaphragm to oppose a pressure acting upward under the diaphragm. In order to control higher pressures without using impractically heavy weights this power is frequently multiplied by employing a lever and fulcrum. Still another gravity type of regulator depends upon a column of mercury or liquid to supply the diaphragm resistance. In all of the aforementioned types the diaphragm is always directly connected to the valve plug by means of the valve stem. For this reason regulators so constructed are known as "direct acting."

There are but two general classifications of pressure regulators—those where an increasing pressure on the diaphragm closes the valve, these being known as reducing regulators; and in contrast, the back pressure regulators or relief valves in which an increasing pressure on the diaphragm opens the valve.

These two classifications of regulators are further divided into "direct acting" (Fig. 2) and "pilot operated" types.

One of the most common problems that confronts engineers working with regulation is the question of where to use direct acting regulators and where to insist on the pilot operated type.

Let us investigate just what we may expect from a direct acting type of regulator and what its limitations are. For this investigation we will consider the most improved type which utilizes a nest of multiple springs to supply resistance to the controlled pressure acting on the diaphragm (Fig. 3). Such a regulator has a non-corrosive stainless steel valve stem which rolls up and down on frictionless ball bearings. Every mechanical and metallurgical refinement possible has been made to eliminate corrosion and friction. It will be interesting to see just what are the limitations of a direct acting type of regulator.

These limitations are largely the result of the basic principle of direct acting regulators, namely, that the amount of valve travel is proportionate to the load change per pound of the controlled pressure exerted on the diaphragm. Obviously this is limited by the total diaphragm load. The area of the diaphragm is governed by the range of pressure to be controlled. Low pressure regulators of course have much larger diaphragms than do high pressure regulators. Thus for example a regulator operating at 100 lbs. has a diaphragm with an area of 20 square inches (Fig. 4), while one working at 30 lbs. has an area of 63 square inches and one at 10 lbs. has double the area or 132 square inches. Now suppose we increase the controlled pressure 1 pound on the 100-lb. regulator, which acting over an area of 20 square inches produces an increase in force opposing the springs of 20 lbs. According to Hooke's Law, it will be recalled, a characteristic of all springs is that their deflection is proportional to the force applied. We therefore obtain a valve movement in the 100-lb. regulator proportional to the 20 lbs. increase in load on the springs. In like manner, a 1-lb. change in the controlled pressure acting on the 132-inch diaphragm exerts a force of 132 lbs. on the springs and the corresponding proportional spring deflection and valve travel.

The difference between these regulators is further accentuated by the fact that in the 100-lb. regulator the set of springs must be capable of supporting a load of 3100 lbs., while in the 10-lb. regulator the springs are only required to carry a diaphragm load of 1300 lbs. By a set of springs capable of carrying a load of 3100 lbs. we mean a set of springs that require a force of 3100 lbs. be exerted on them in order to compress them until their coils are all "dead" or touching one another and capable of no further compression. It follows, therefore, that a 1-lb. change in diaphragm pressure will produce spring deflections as follows:

$\frac{20}{3100} = \frac{1}{155}$ of the total compressibility of the springs (100-lb. regulator)

$\frac{63}{2000} = \frac{1}{32}$ of the total compressibility of the springs (30-lb. regulator)

$\frac{132}{1300} = \frac{1}{10}$ of the total compressibility of the springs (10-lb. regulator)

Now, since the total compressibility or adjustment of these sets of springs is 3 inches, we obtain the following amounts of valve

*Presented before the Southern California Meter Association, April 23, 1931.

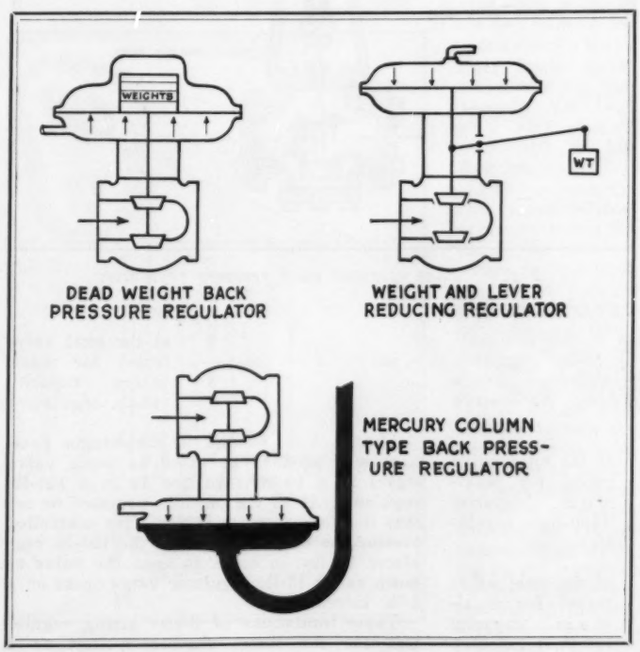
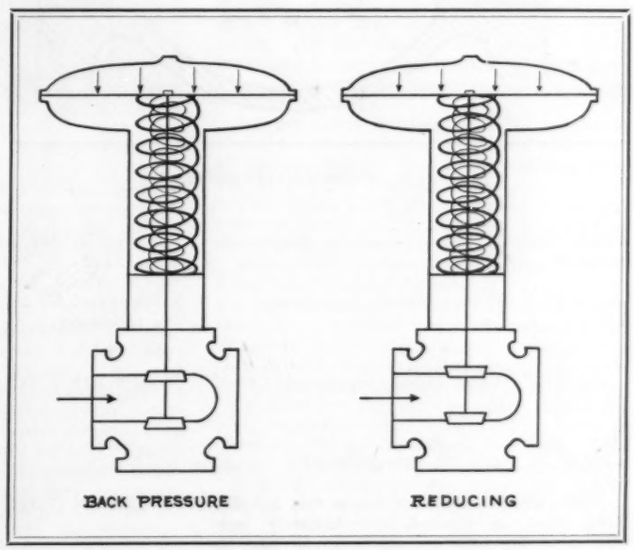



*Fig. 1, at left, diagrammatic sketches of gravity type regulators.*
*Fig. 2, below, diagrammatic sketch of direct acting pressure regulators.*



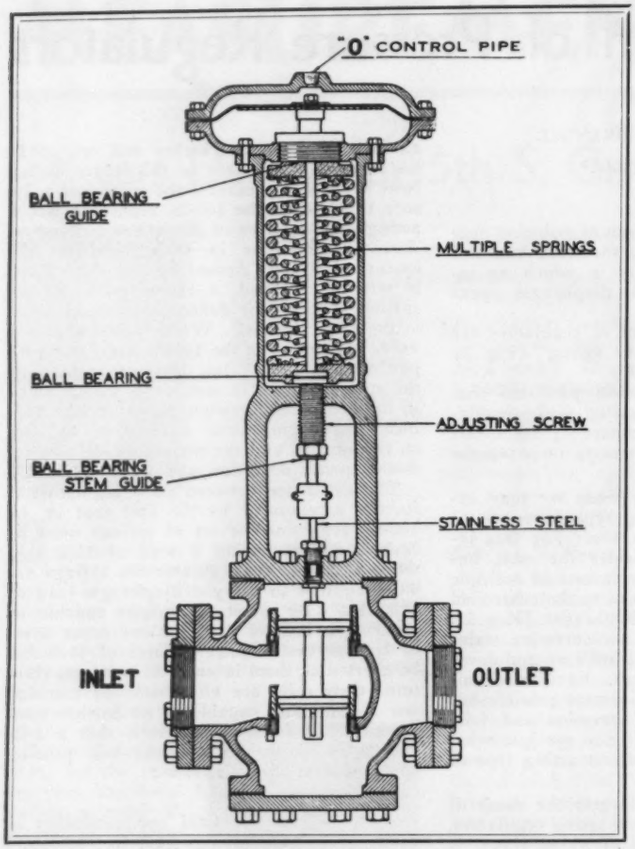



*Fig. 3. Advanced type of spring loaded direct acting reducing regulator.*

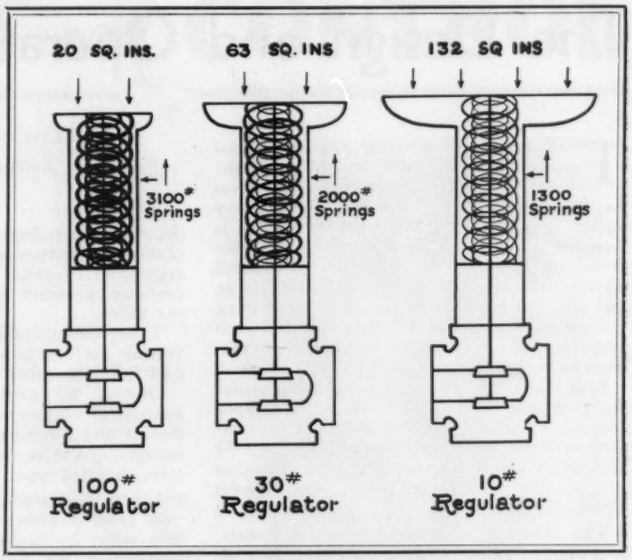



*Fig. 4. Relative diaphragm sizes.*

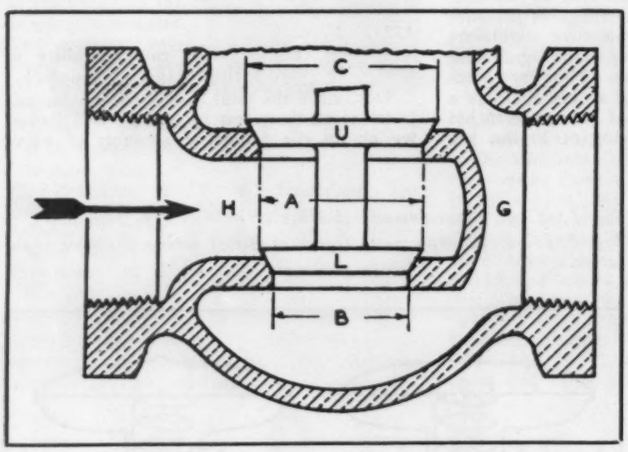



*Fig. 6. Balanced type valve.*

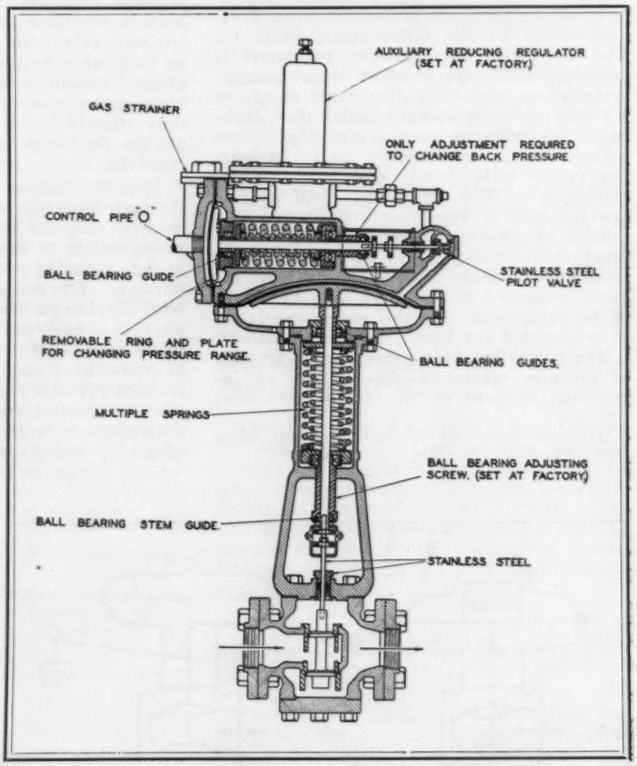

AUXILIARY REDUCING REGULATOR (SET AT FACTORY)
GAS STRAINER
ONLY ADJUSTMENT REQUIRED TO CHANGE BACK PRESSURE
CONTROL PIPE "O"
BALL BEARING GUIDE
STAINLESS STEEL PILOT VALVE
REMOVABLE RING AND PLATE FOR CHANGING PRESSURE RANGE
BALL BEARING GUIDES
MULTIPLE SPRINGS
BALL BEARING ADJUSTING SCREW. (SET AT FACTORY)
BALL BEARING STEM GUIDE
STAINLESS STEEL

*Fig. 5. Pilot operated back pressure regulator.*

travel from a 1-lb. change in diaphragm pressure:

$\frac{1}{155} \times 3'' = .019$ in. (100-lb. regulator)

$\frac{1}{32} \times 3'' = .094$ in. (30-lb. regulator)

$\frac{1}{10} \times 3'' = .3$ in. (10-lb. regulator)

Then, since it has been found that a valve plug must be opened approximately one-fourth of the pipe size in order to pass its full capacity, we may draw further comparisons. Let us consider a 2-in. regulator which would have approximately ½-inch valve travel for maximum flow. We observe the following:

$\frac{1}{2}$ in. $\div .019 = .048 = \frac{1}{20}$ of the total valve travel for maximum capacity (100-lb. regulator).

$\frac{1}{2}$ in. $\div .094 = .188 = \frac{1}{5}$ of the total valve travel for maximum capacity (30-lb. regulator)

$\frac{1}{2}$ in. $\div .3 = .6 = \frac{3}{5}$ of the total valve travel for maximum capacity (10-lb. regulator)

Thus a 1-lb. change in diaphragm pressure will produce 12 times as much valve travel in a 10-lb. regulator as in a 100-lb. regulator. Or if we consider pressure we see that it is necessary to increase the controlled pressure on the diaphragm of the 100-lb. regulator 12 lbs. in order to open the valve as much as the 10-lb. regulator valve opens on a 1-lb. increase.

These limitations of direct acting regulators are the same whether springs or a

weight and lever are utilized to provide the diaphragm resistance. They are inherent and can never be removed.

From the three examples studied it becomes apparent that as we go to higher pressures in direct acting regulators we may anticipate even greater pressure variations at such times as the valve must be opened to near its maximum capacity.

With the coming of modern high pressures for gas transmission lines and absorption plants and refineries, the pilot-operated type of regulator was perfected (Fig. 5). This consists of a regular direct-acting regulator whose diaphragm operating pressure is supplied by a pilot valve, with this pilot valve being operated in turn by the pressure which is being controlled. In this manner a mere fraction of a pound pressure variation on the pilot valve diaphragm is ample to actuate the pilot valve sufficiently to permit the operating gas or air to exert its force on the main diaphragm. This increasing pressure on the main diaphragm forces the main valve open enough to handle the full volume without permitting the pressure to build up.

From this comparison it may seem that the performance of the direct-acting regulator is far inferior to that of a pilot-operated type. This is true in certain respects, although there are many cases where the simpler type provides satisfactory regulation. For example, for pressures below 10 lbs. the direct type is generally preferred since a pilot-operated regulator may tend to "flutter." This is caused by the inherent sluggishness of all low pressure service, by the proportionately large pipe line drops at low pressures, and also the small differential operating pressure on the pilot valve diaphragm. For pressure above 50 lbs. where large varying volumes must be handled with a very small allowable pressure variation a pilot-operated regulator should generally be used.

The direct-acting type will still be found highly efficient for handling fairly constant volumes up to 150 lbs. For pressures above 150 lbs. the pilot operated type of regulator is normally desired to insure sensitive close regulation.

Practically all regulators are made with what is known as balanced valves. (Fig. 6). That is, the valve has two ports and the valve plug has an upper and lower valve disc of almost exactly the same area. This permits the valve plug to be operated easily, regardless of the line pressure flowing through the valve body. Regulators should always be installed in the line so that the liquid flows into the bridge between the upper and lower valve disc. As will be seen, this gives a practically balanced force tending to push the top valve disc upward and the bottom disc downward. This condition is always the same regardless of the pressure in the line, which allows the valve to be opened or closed easily, even though high pressures are being controlled. This fact precludes the use of the single seated or unbalanced valve because the line pressure is unbalanced and tends to force the valve disc open when it is closed and to hold it open when the diaphragm or springs are endeavoring to close it. Thus sensitive regulation can not be obtained with the single-seated regulator unless some other means of balancing the disc is introduced. In most cases this is impractical, both from a mechanical and an economic standpoint. Occasionally regulators cause trouble from being installed in the line backwards. As will be seen from the illustration, if the line pressure is brought into the regulator in the opposite direction the area "C" is greater than area "B," whereas the two areas "A" are practically the same. This unbalancing effect interferes with close regulation by always tending to hold the valve plug closed, an error which is increased in direct proportion to the increase in line pressure. With the exception of certain vapor recovery regulators which are made without stuffing boxes, you are generally right if you install the regulator in the line so that flow is into the bridge as shown by the arrow in Fig. 6.

Present day regulators have been perfected to the point where what few service calls the manufacturers do have are largely the result of not installing the proper regulator for the job or of changing the operating conditions radically after its installation. It is our sincere hope that the few points of regulator design and operation analyzed in this article may aid in choosing and using regulating valves more easily in the future.

# Large Volume Measurement Stations

*By* B. G. WILLIAMS

*Southern California Gas Company**

*KETTLEMAN Hills Measuring Station:* The gas which the Southern California Gas Co. receives from the Kettleman Hills area, is all delivered through one master measuring station. This is shown in Fig. 1.

There are five separate accounts of the gas as it passes this point. The amount received from the three sources of supply must be measured separately, and also, an account must be kept of the gas delivered into each of the two outlet lines.

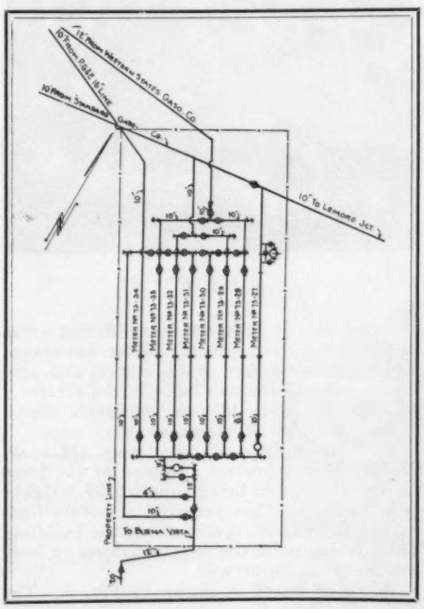



*Fig. 1.*

*B. G. Williams*

One of these lines leads northward into the San Joaquin Valley, and the other southward to Los Angeles.

The gas from the two largest sources of supply enters the station, in each instance, by means of two lines. This plan serves the dual purpose of allowing the gas from either company to be delivered into either the north or the south line, and also, if both lines are used it makes a more uniform entrance of the gas into the measuring station.

The station proper consists of one 8-inch and six 10-inch orifice meters with an additional 10-inch check meter, and the lines necessary to by-pass the station.

These meters each have a straight run of 20 feet of pipe up-stream, and 20 feet down-stream. All are equipped with straightening vanes. In general, they are installed according to the American Gas Association specifications. The differential and pressure gauges are for 50 inches and 500 pounds, but the pressure is seldom more than 400 pounds.

*Newhall Measuring Station:* Before entering the city of Los Angeles, all of the gas from the Kettleman Hills fields, from the Taft fields, and from the Ventura fields, is carried for several miles in parallel lines.

Along these lines at a point near Newhall there has been built a station for the purpose of odorizing, regulating, and measuring this gas. The plan of this station is shown in Fig. 2. The gas enters the station through three pipe lines, and also leaves through three lines.

The plan shows the location of the straightening vanes, in the orifice meters; also, the location of the regulators and thermometer wells. The odorizing pots are shown on the down-stream side of the regulators. All gas passing this point is odorized, and by means of the measuring equipment, the required amount of odorant is supplied at all times.

All gas received from the fields mentioned above is accounted for at this station, and all gas passing this station must be accounted for in the Los Angeles area.

This gives an excellent check of the gas received in the fields, and also, a record of the gas delivered to points beyond.

*West Los Angeles Measuring Station:* From the Newhall Measuring Station there are two 12-inch lines and one 16-inch line, extending southward to Los Angeles via San Fernando Road. Also, there is one 22-inch and 26-inch line extending along, or near, Sepulveda Boulevard, to West Los Angeles.

In West Los Angeles there is a measuring and regulating station which operates to distribute the gas to several locations. This station is shown in Fig. 3. From the 26-inch line in the street, the gas enters the station through the two 16-inch lines shown on the

*Presented before the Southern California Meter Association, May 28, 1931.

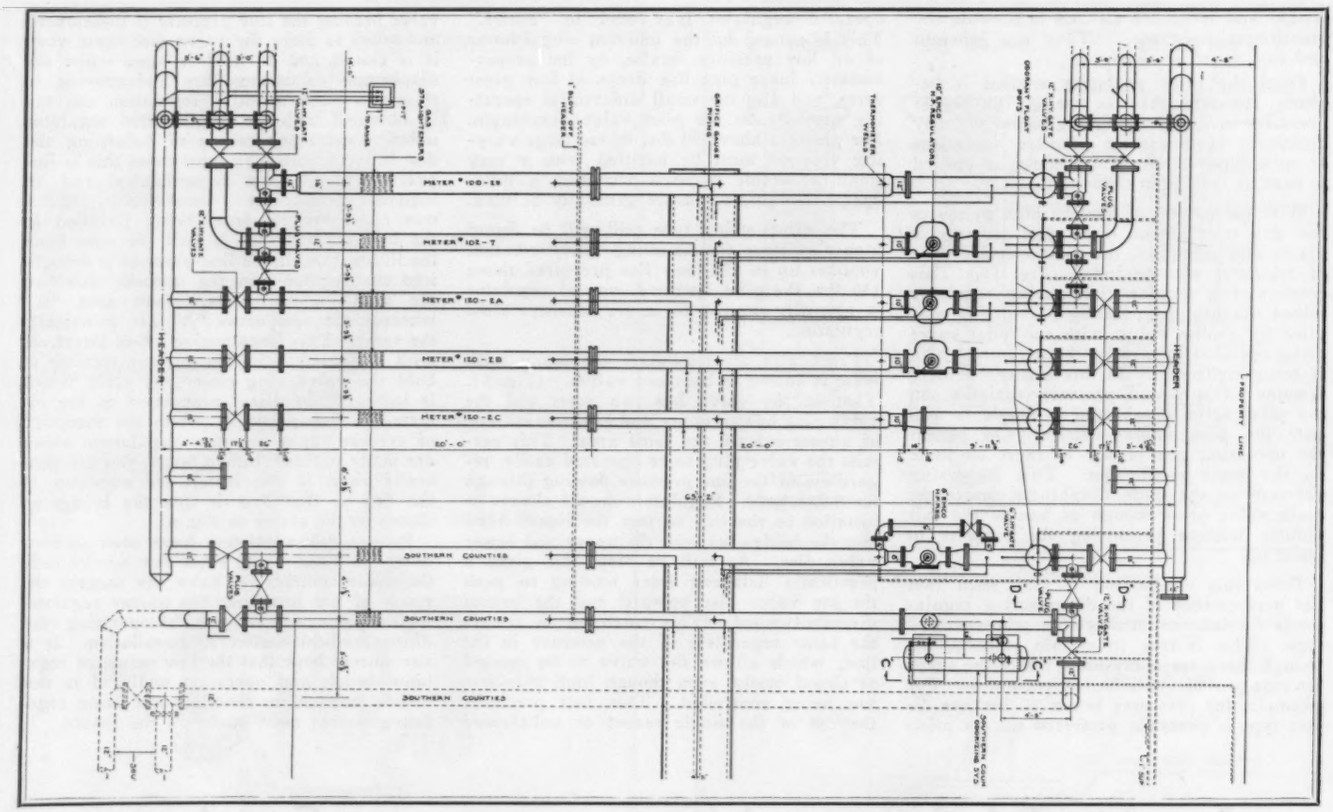



*Fig. 2.*

left, and passes into a 26-inch header shown in the extreme rear. From this header, it passes through four 10-inch orifice meters, and three 12-inch orifice meters.

At 100 pounds pressure and 50 inches differential these meters have a combined maximum capacity of 270,000,000 cubic feet of gas per day.

Owing to governing conditions it is not possible to operate by using all of these meters at the maximum capacity at any time. However, the station should be able to measure 150,000,000 cubic feet of gas per day under conditions as they now exist.

Toward the right in Fig. 3 is shown a cross-over. This is arranged so that any of the lines may be by-passed into any other line. It also leads to the vertical blow-off shown in the rear. By means of this any of the pipes may be blown off, and the gas carried to the atmosphere.

*Slauson Avenue Measuring Station:* The Slauson Avenue Station is shown in Fig. 4. At this point part of the gas is sold at whole-

*Fig. 3.*

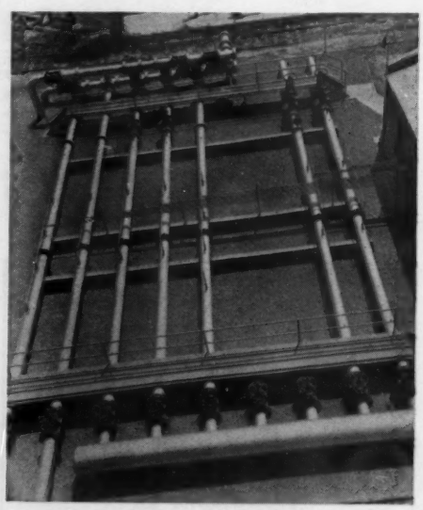


*Fig. 4.*

sale and part is delivered into different areas in the distribution system. There are seven-12-inch orifice meters at this station and provision is made for two more in the future.

There are four 10-inch regulators shown on the low side of the meters.

In these stations all regulators are operated by remote control. Instead of the force on the diaphragm being supplied by weights, it is supplied by gas pressure. Pressure lines extend from each regulator into the building, from which point the operator raises or lowers the pressure at will.

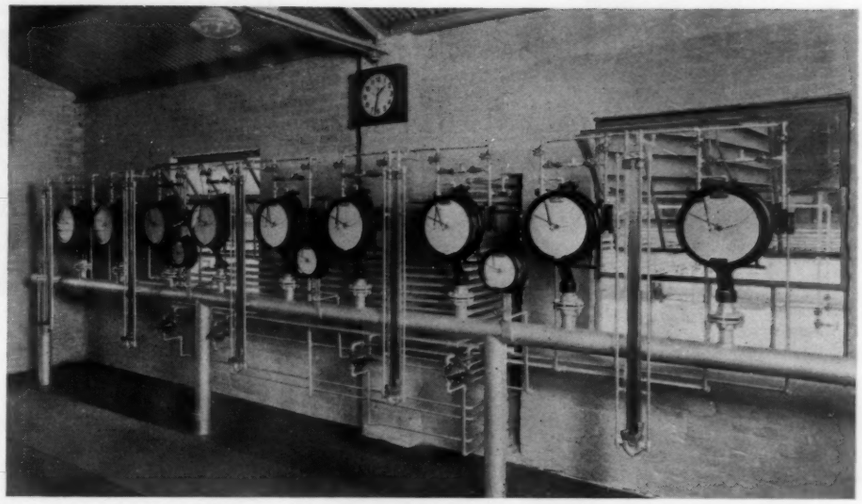
A gauge board is shown in Fig. 5. The four pilot control regulators are located just below the header used to support the gauges.

*AT RIGHT:*

*Fig. 5.*

When the operator is increasing the pressure on the low side of the regulator, care must be taken not to increase the flow so rapidly as to produce more than 50 inches differential. By having the differential gauge in view while the pressure is being increased, the operator is able to increase it as rapidly as possible, and still permit the gas to be measured.

In the design and construction of all of these stations, care has been exercised to build the best measuring equipment possible. The inside diameters of the orifice meter tubes have been calibrated to the nearest thousandth of an inch, on both the up-stream and down-stream sides of the orifice. These were calibrated at a point one pipe diameter from the orifice. Then pipe was carefully selected so as to be free from irregularities that would affect the measurement.



### San Diego Consolidated May Negotiate for "Natural"

A statement last month from the San Diego Consolidated Gas and Electric Co. of San Diego, Calif., indicated that a proposition would be submitted to the city council some time within the next 60 days by the company for serving natural gas throughout its system.

### Ira W. McKee Now Secretary, Wyandotte County Gas Co.

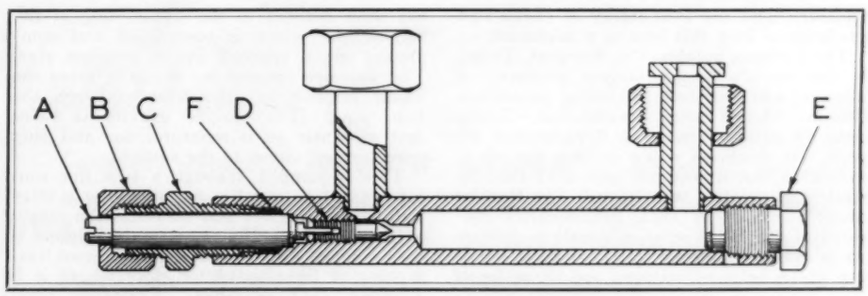
Ira W. McKee, formerly auditor with the Kansas City general office of Gas Service Co., has been made secretary of the Wyandotte County Gas Co., Kansas City, Kan.

### Bucklin Permit to Central States

Central States Gas Utilities Co. has been granted a natural gas franchise by the town of Bucklin, Kan.

## Damping U-Tube by the Foxboro Company

A NEW Damping U-Tube has been announced recently by the Foxboro Co., Foxboro, Mass., for use on the new style flow meters and flow controllers. This U-tube can be adjusted for proper damping while the instrument is in operation. There is no need of shutting the pressure off or taking the instrument apart in order to make this adjustment.




*Damping U-Tube for use on new style flow meters and flow controllers.*

In the illustration above, "A" is a "screwdriver" which is fitted to the end of needle valve "D." By turning "A," adjustments can be made in the damping without the mercury being forced out. These adjustments can be made very minute or very large as conditions warrant.

The new U-tube is not furnished as standard equipment but must be specified when ordering a new flow meter or flow controller. It may be ordered for installation on all Foxboro flow meters or flow controllers now in the field except types T, C, A and B.

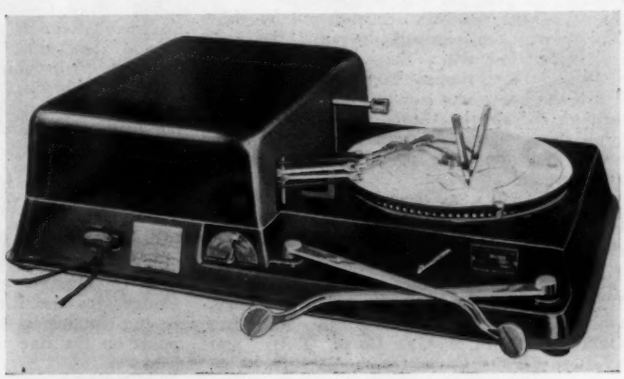
## Pittsburgh Equitable Buys McGaughy Integrator Co.

IT has recently been announced to the gas industry that the Pittsburgh Equitable Meter Co. has acquired all assets of the McGaughy Integrator Co. of Tulsa, Okla., consolidating the resources and manufacturing experience of the two companies.

The company will manufacture the McGaughy integrator, shown in the illustration, in addition to its present line of products, including the "Emcolator". Both the "Emcolator" and the McGaughy integrator calculate orifice meter charts. Before the development of the integrating machine it was necessary to calculate the totals from charts through the observation method. An operator who has had a few weeks experience can now handle approximately 300 charts per day by the machine method.

*AT RIGHT:*

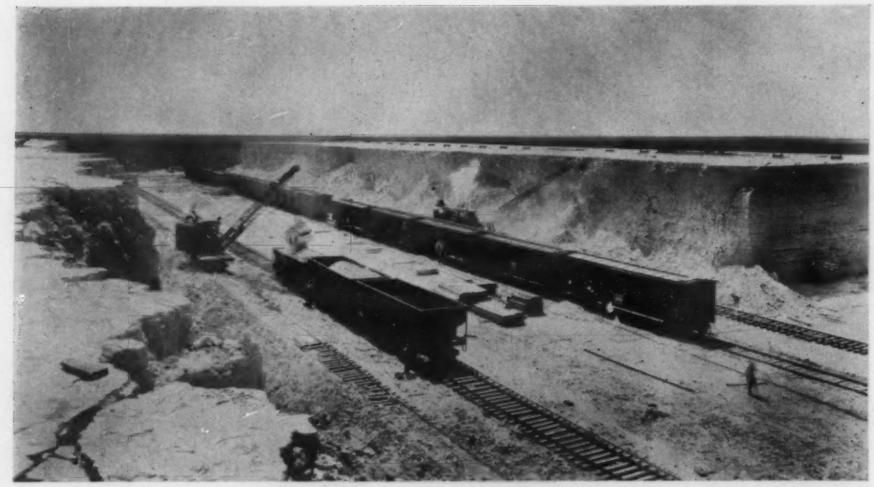
*The McGaughy integrator which is now being manufactured by Pittsburgh Equitable Meter Co. in addition to its former line of products.*



### Work Begun on Bogalusa Extension; Service for Winter

Louisiana Power & Light Co., with headquarters in New Orleans, La., has obtained franchises to serve natural gas to the following Louisiana towns: Slidell, Covington, Amite, Hammond, Ponchatoula, and Independence. Work was started June 1, on a pipe line extension from the Bogalusa line of the United Gas System.

Construction is expected to be completed about September 1, with natural gas service to be available in these communities for the coming winter.



*Sulphur storage and loading tracks. The sulphur is loosened with dynamite and loaded with locomotive cranes.*

# Gas Use in Sulphur Mining Process

*(Continued from Page 25)*

necessary, and the availability of cheap fuel gas helps to keep this item to a minimum.

The Freeport Sulphur Co., Freeport, Texas, is the world's second largest producer of sulphur, and has two producing properties, Hoskins Mound and Bryanmound, Texas, some 23 miles apart. The Bryanmound deposit was disclosed while drilling for oil in 1900-1905, but it was not until 1913 that the mining of sulphur was started. At Hoskins Mound, opened in 1923, preliminaries consisted of digging 5 miles of canals to procure an adequate supply of water, and the building of 15 miles of railroad and 10 miles of shell road.

The power and water heating plant was the largest item of expense and in this case included 12 steam boilers of 700 horse power each. This plant operates continuously without a moment's shutdown during the 365 days of the year, and has an efficiency of 80 per cent. Oil was tried out and discarded and gas was adopted as the fuel with the high efficiency stated. These boilers furnish steam for three turbo-generators which in turn supply electric power for motors operating drilling equipment and some of the pumps in the field. The rest of the steam is used in engines operating the 36 pumps in the plant as well as the eight air compressors. The exhaust steam is piped to the eight water heaters.

Water storage for the plant amounts to 100,000,000 gal., the water being pumped from canals into two reservoirs of equal capacity. It is drawn from here, by gravity, to feed the boilers and is used at the rate of 6,000,000 gal. per day. This water is lifted by 18 cold water pumps into the heaters where live steam heats it to 340° F. This hot water is forced, by 16 other pumps, through pipe lines to the various wells in the field, and then underground to the sulphur beds. It is necessary to carry this water distances varying from 2,000 to 5,000 feet.

Originally the well is walled off with an 8-in. casing and in order to equip it for sulphur removal a 4-in. line containing a 1¼-in. pipe is lowered into it and sealed off at the head. The hot water is forced down the casing and when enough surphur has been reduced to the liquid state at the bottom, the water is turned off and compressed air is released in the smallest pipe. The pressure created by this air forces the liquid sulphur to the surface through the 4-in. pipe. The specific gravity is twice that of water so it separates out and only pure surphur comes to the surface.

This is pumped, through a 4-in. line containing a 1-in. gut line for steam, to a relay station that receives and measures the output of each of the wells. The liquid sulphur is then pumped through more steam heated lines to bins of light board structure where it is confined until solidified. Enormous cakes are thus built up and the slides stripped off. These cakes are then broken with dynamite as needed, loaded on cars with a traveling crane and reloaded on ships in the harbor for delivery to the ports of the world.

Part of the water pumped underground rises to the surface through wells drilled for this purpose. This is known as bleed water, and is pumped to heat exchangers located part way between the power plant and the wells. These are a series of tanks with coils, the bleed water at 180° F. circulating through the tanks and heating fresh water that is pumped through the coils. This heated fresh water at 120° F. is then pumped into the heaters at the power plant. Approximately 2,000,000 gal. of fresh water are preheated daily in this manner, which saves about $160 per day in fuel costs.

One of the problems encountered at this deposit was the non-subsidence of the cap rock formation when the sulphur was removed. This leaves large cavities into which the hot water runs without circulating through the surphur-bearing formation. To offset this, mud is dredged and mixed with water and fills these cavities when pumped underground.

## Three Oklahoma Companies Ask Shawnee Franchise

Three Oklahoma utilities are asking for a franchise to serve natural gas in Shawnee, Okla.: Harris & Haun of Blackwell, Okla., Oklahoma Natural Gas Corp., Tulsa, and Western Service Corp., Oklahoma City.

## Prize Winners in P.U.A.A. Better Copy Contest

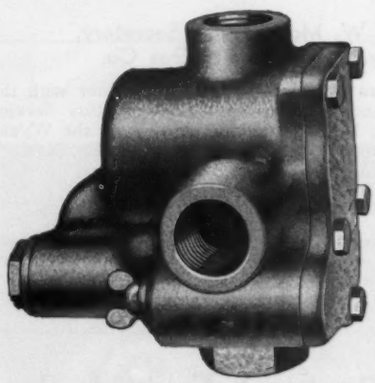
Prize winners in the Public Utilities Advertising Association annual contest were announced at the recent convention of that body, held at New York, June 16 and 17. Twenty-one awards were made by the Association's Better Copy Committee.

First prize in the Gas Institutional Division was given to New Orleans Public Service Inc., New Orleans, La. First in the Gas New Business Division was awarded to Lone Star Gas Co., Dallas, Texas. First award in the Electric Institutional Division was given to Pacific Gas and Electric Co., San Francisco.

Northern States Power Co. took first in the Financial Division. To Consolidated Gas Co. of New York went the first prize in the Gas Car Card Division. First in the Gas Poster and Billboards Division went to Public Service Co. of Northern Illinois, Chicago, while Northern States Power Co., St. Paul, Minn., took first in the Electric Poster and Billboards Division.

## Wilcolator Co. Announces New Thermostatic Mixing Valve

The Wilcolator Co., Newark, N. J., manufacturer of heat controlling devices, has just placed a thermostatic mixing valve on the market. The Wilcolator Mix-O-Stat is designed to deliver water at a constant temperature regardless of variations in temperature of the hot or cold water supply.



Following are some of the features of the new valve: No pivots, links or mechanical movements are used. Copper bronze and stainless steel are employed. The control valve is located in the cold water inlet. The valve and thermostat are in one unit and it is tapped for standard pipe sizes.

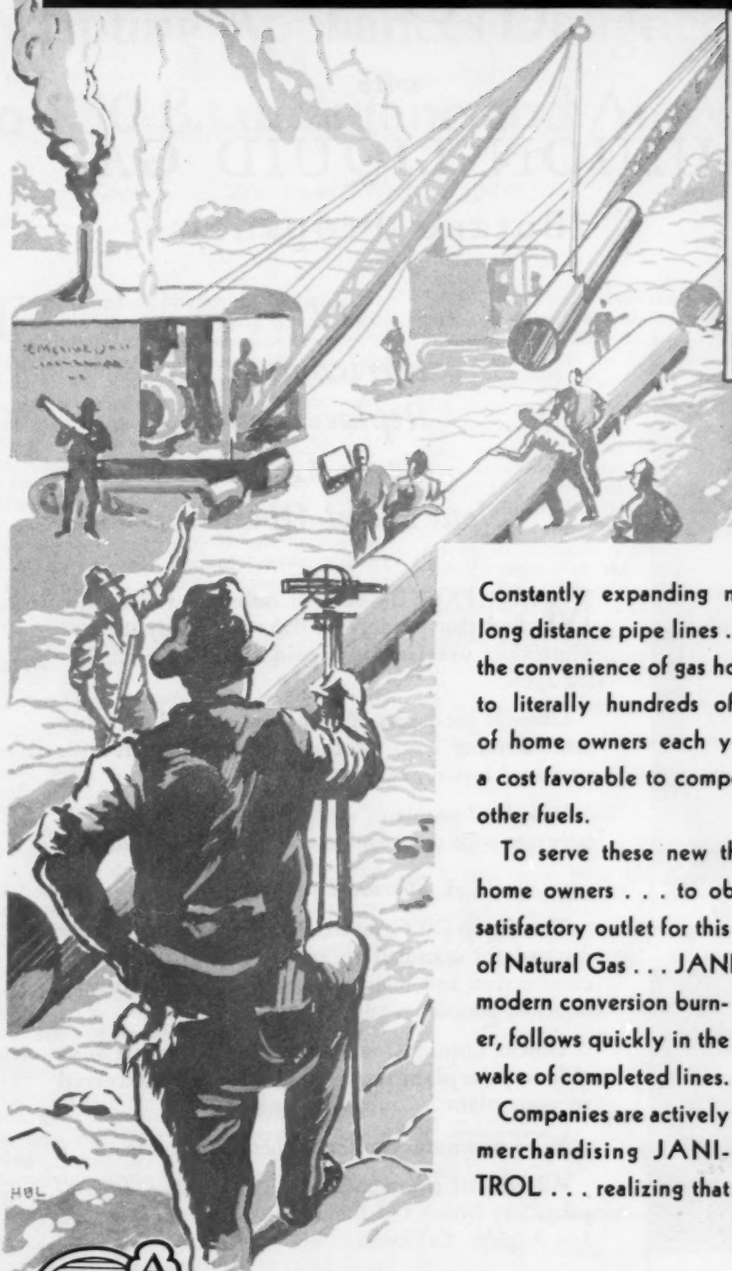
## San Diego Consolidated Getting Ready to Serve San Ysidro and Otay

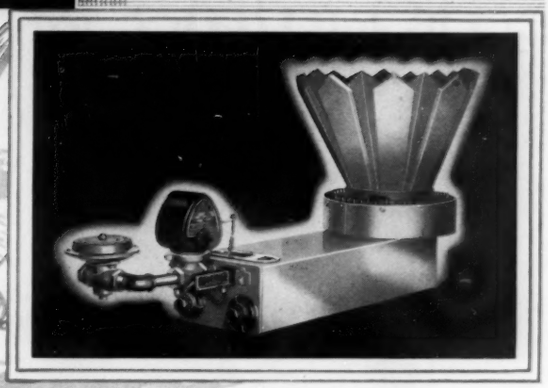
San Diego Consolidated Gas and Electric Co., San Diego, Calif., plans to begin service in San Ysidro and Otay, near the Mexican border, by August 1. Construction was expected to begin late in June on the 4-inch line from the present southern terminus of the company's lines.

## Manson, Iowa, to Be Served From Missouri Valley Line

Manson, Iowa, will soon be served with natural gas from the Missouri Valley Pipe Line Co.'s major carrier from Texas. Fort Dodge Gas and Electric Co., of Fort Dodge, is constructing a 15-mile extension from a point on the line near Fort Dodge to serve Manson.

# JANITROL
## FOLLOWS THE NEW PIPE LINES





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The Columbus Furnace and Heatmaster . . . Surface Combustion's complete gas-fired warm air furnaces . . . are also providing new outlets for gas . . . replacing solid-fuel fired warm air systems . . . installed in newly built homes.

* * *

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SALES AND ENGINEERING SERVICE
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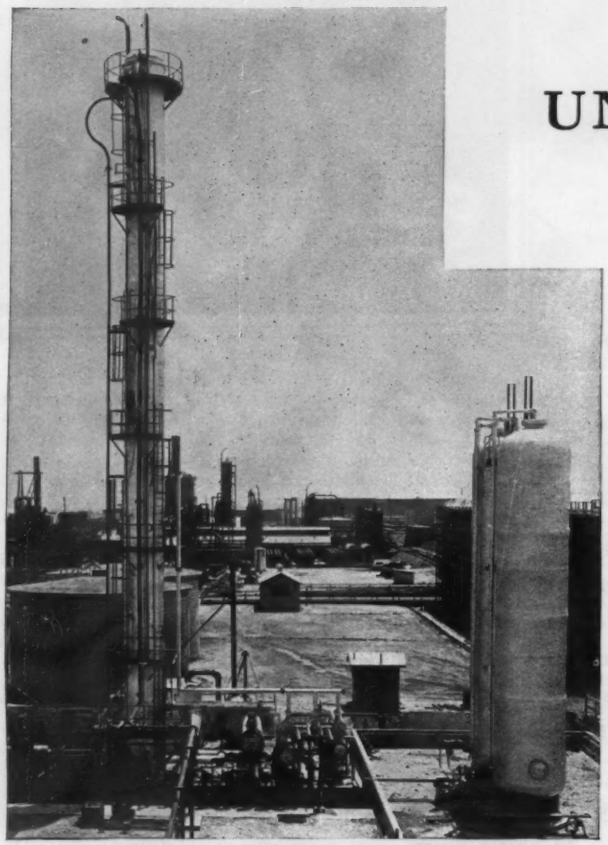

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*Special Union tank for delivery of Liquid Gas—right to the user's plant*

*with*

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MANUFACTURERS of carburetted water gas find that production costs are greatly reduced when they use Union Liquid Gas as the enriching agent.

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# UNION OIL COMPANY

BUTANE - PROPANE NEWS
Covering Liquefied Petroleum Gas Service

# Adapting Appliances Designed for 550 B.t.u. Oil Gas to 550 B.t.u. Butane and Air Mixtures

*By* F. M. COTA, C. E. WHITE *and* W. E. DAYNES
*San Diego Consolidated Gas and Electric Company**

THE increased interest of the gas industry in the use of butane and other liquefied hydrocarbons as means of increasing plant capacities for peak load requirements and for the replacement of worn out equipment has made it necessary that we obtain more information on appliance adjustments necessary with the use of either butane or butane and air.

Facing the possibility of using an air and butane plant at Escondido, Calif., to replace our present oil gas generating equipment, we made a series of tests to determine whether 550 B.t.u. gas, composed of butane and air in the proper proportions, could be used in appliances designed for 550 B.t.u. manufactured oil gas and vice versa, and whether or not a mixture of butane and air would separate into strata of the two constituents.

*Apparatus and Procedure*

Fig. 1 is a diagrammatic sketch of the apparatus used in our test and is self-explanatory. Figs. 2, 3 and 4 show the actual installation.

A predetermined amount of air was metered into the small holder and then the required amount of butane gas to make 550 B.t.u. gas was slowly injected into the holder. The holder was then pumped down and the process was repeated. This was done until the required amount, usually from 60 to 120 cu. ft., was stored in the large storage tank. The outlet of this tank was connected as shown in Fig. 1 to a pounds-to-pounds regulator, then to a pounds-to-inches regulator which reduced the pressure to 6 inches water column. This gas was then piped to the test bench.

*Note:* The so-called "butane" of this report was a liquefied hydrocarbon consisting of butane and other hydrocarbons and following closely the specification for G-3. Calorimeter determinations were made of each batch of butane and air, using the Thomas and Junkers calorimeters.

*Butane:* The calorific value (see Table No. 1) of the first fractions released from tanks of commercial butane, furnished by a California oil company, were determined with the Junkers calorimeter. (The burner of the latter was fitted with a small orifice.)

**Table No. 1. Calorific Value of Commercial Butane**

| Tank No. | B.t.u. per Cu. Ft. |
|---|---|
| 1 | 2796 |
| 2 | 3033 |
| 3 | 3156 |

The gas was drawn from the top of the tanks, and tests on mixtures of commercial butane and air later indicated greater heating values due to the progressive distillation of the liquefied gas.

*Butane and Air:* On the assumption that the calorific value of the butane was 2796 B.t.u. per cu. ft., four tests were made with a mixture containing 19.66 per cent butane and 80.34 per cent air, placed in a 10-cu. ft. water seal holder, for the express purpose of determining whether a gas with 550 B.t.u. per cu. ft. could be obtained. Evidently the calorific value of the butane was already greater than 2796 B.t.u. per cu. ft., as the mixture was found to be as follows:

**Table No. 2. Calorific Value of Butane-Air Mixtures**

| Run No. | B.t.u. per cu. ft. Mixture | B.t.u. per cu. ft. Butane (Calculated) |
|---|---|---|
| 1 | 593 | 3014 |
| 2 | 559 | 2841 |
| 3 | 555 | 2821 |
| 4 | 564 | 2867 |
| Average | 568 | 2885 |

*Stratification Tests*

Eleven tests were made to observe any tendency of a mixture of butane and air to stratify.

The proportions of air and butane which were supposed to form a mixture with 550 B.t.u. per cu. ft. were injected in order into a 10-cu. ft. water seal holder. The amount of natural mixing was ascertained by continuously sampling the gas from the holder and testing either its calorific value or its oxygen content.

Two facts are apparent from Tables No. 3 and No. 3-a. First, when butane gas is drawn from the top of the liquid a gas of non-uniform composition is obtained, as the fluctuation in the calculated heating value indicates. Second, that the butane and air will diffuse rather than stratify if allowed to stand together for some time, as the calorific value or oxygen content of the mixtures which stood for 20 hours was uniform throughout the tank, but variable immediately after measuring. Before diffusion the top of the holder contained the lesser, and the bottom of the holder the greater proportion of butane.

**Table No. 3. Calorific Value of Butane and Air Mixtures as Shown by Successive Samples When Vapor is Taken from Top of Container.**

| Date of Test | Average B.t.u. |
|---|---|
| Jan. 3, 1930 | 547 |
| Jan. 6, 1930 | 567 |
| Jan. 6, 1930 | 572 |
| Jan. 7, 1930 | 562 |
| Jan. 8, 1930 | 562 |
| Jan. 8, 1930 | 570 |
| Jan. 9, 1930 | 551 |
| Jan. 10, 1930 | 561 |
| Jan. 11, 1930 | 563 |
| Average | 561.7 |
| $C_4H_{10}$, calculated | 2857 |
| $C_4H_{10}$, first test | 2796 |

*Presented at the Northern Regional Conference of the Pacific Coast Gas Association, Tacoma, Wash., June 11-12, 1931.

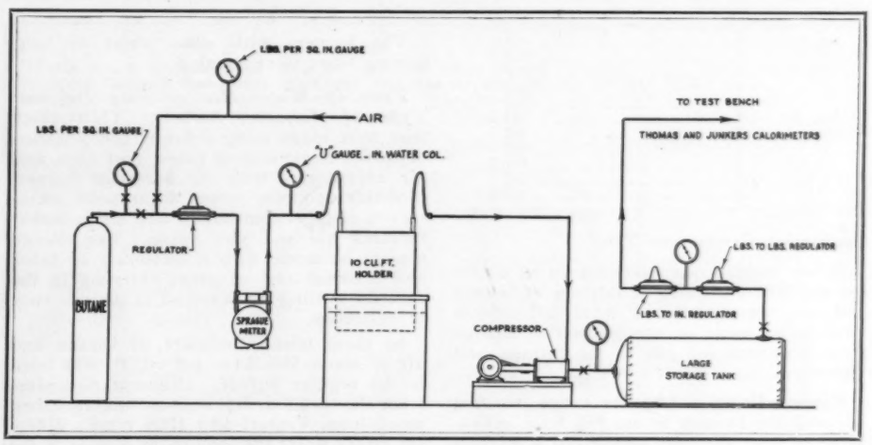



*Fig. 1. Diagrammatic sketch of butane and air mixing apparatus.*

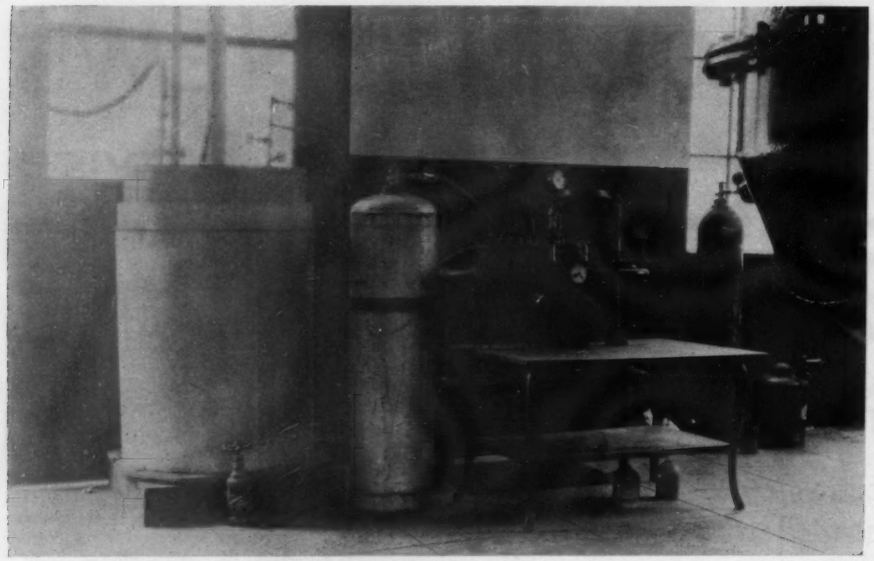


*Fig. 2. Showing mixing apparatus, small holder and butane tank.*

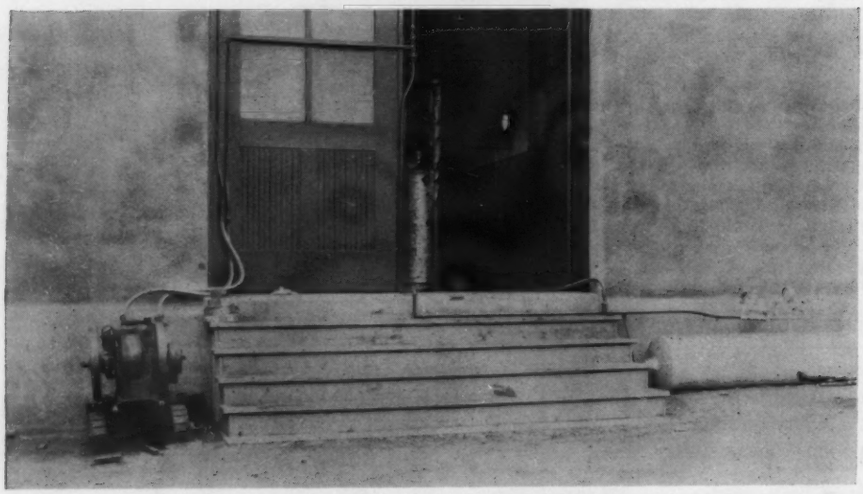


*Fig. 3. Compressor and storage tank.*

**Table No. 3-a. Calorific Value of Butane and Air Mixture Taken from Top of Gas Holder as Holder Was Being Depleted, after Mixture Had Stood for 18 Hours**

**(Sample Was Taken Every Cubic Foot.)**

| Tank | Test No. | B.t.u. |
|---|---|---|
| No. 1 | 1 | 562 |
| | 2 | 562 |
| | 3 | 562 |
| | 4 | 562 |
| | 5 | 564 |
| No. 2 | 1 | 563.5 |
| | 2 | 562 |
| | 3 | 562 |
| | 4 | 561.5 |
| | 5 | 562 |
| | 6 | 563.5 |

*Qualitative Combustion Tests*

Before making quantitative tests on different appliances burning a mixture of butane and air, we determined what adjustments were to be made on the burners to change from manufactured gas to the former, and vice versa.

*Range.* Using a 3-burner range, we first adjusted the burners to use 550 B.t.u. manufactured gas. We then substituted a mixture of 550 B.t.u. butane-air gas. The following changes only were necessary to burn the butane-air mixture satisfactorily:

Air shutter approximately 90 per cent closed.

Orifice unchanged.

The burners with either short or long mixing tubes were suitable.

*Tests on Water Heater Using Different Types of Horseshoe Burners:* Thirty-three tests were made using different combinations of orifice sizes, mixing tubes, port sizes and air adjustments with the horseshoe burner. to decide upon the proper adjustments necessary to change from butane and air to manufactured gas and vice versa. The change was to be made with a minimum of labor and material and no great variation in the time for heating the water or in the efficiency of utilization.

In these tests, a mixture of butane and air of about 550 B.t.u. per cu. ft. was tried in the regular burner. Different port sizes from 26 to 32 drill; various mixing tubes, short, long, Venturi and Hale types; different orifice sizes; the location of screens in the mixing tube or immediately below the ports; and variations of the needle valve orifice, were tried.

As a rule, very poor combustion resulted. The flame floated away from the ports or fired back into the mixer, or was yellow or smoky, or the heater provided too little secondary air. Usually the rate of gas consumption was low.

A good flame resulted from the use of ports of size 26 drill, a wide orifice and little primary air. As much as 86 cu. ft. of gas per hour passed the ports.

A fair flame was obtained with an adjustable orifice of size 32 drill and a very small amount of primary air.

It appeared that it would be impractical to change from city gas at 550 B.t.u. to butane-air gas at 550 B.t.u. without adjusting the appliance by more radical means than that of the orifice size, primary or secondary air, port size, or shape of the mixing tube.

Check tests on the same burners with manufactured oil gas at 550 B.t.u. showed that, with more primary air and a smaller orifice than was required for butane-air gas, a good, hot flame and a much greater rate of gas consumption (due to the lesser density of manufactured gas) resulted.

Evidently this heater with the regular horseshoe burner was suited only to 550 B.t.u. manufactured oil gas.

*Quantitative Combustion Tests*

*Range:* After making the proper adjustments on the range burners necessary to burn butane and air, efficiency tests were made.

Water was heated on the gas range in an aluminum vessel provided with a cover and thermometer. From the heating value of the gas, the weight of water, and the rise in temperature, the efficiency of utilization was calculated. Both manufactured gas and butane-air mixtures of about 550 B.t.u. were tested with the same equipment.

**Table No. 4. Summary of Efficiencies.**

| Test No. | Efficiency $C_4H_{10}$-Air | Per Cent Mfd. Gas |
|---|---|---|
| 73 | 29.97 | |
| 74 | | 32.7 |
| 75 | 33.4 | |
| 76 | | 28.85 |
| 77 | | 30.54 |
| 80 | 35.82 | |
| 81 | 33.72 | |
| 85 | 30.82 | |
| 86 | 30.5 | |
| 87 | | 31.25 |
| 88 | | 25.6 |
| 89 | | 32.0 |
| 93 | 35.10 | |
| 94 | 33.55 | |
| 95 | | 30.7 |
| 96 | | 32.6 |
| Average | 32.86 | 30.53 |

Table No. 4 shows that the thermal efficiencies obtained with butane and air mixtures are slightly higher than those obtained with manufactured gas. For practical purposes no enlargement of orifices is necessary in interchanging from butane and air to manufactured gas in the range burners tested. The time of heating the water is increased if no change in the size of orifice is made when using butane and air mixtures. An increase in the orifice size would probably make it possible to heat water with the butane and air flame as rapidly as with manufactured gas.

*Water Heater with Regular Burners Adjusted:* Our greatest difficulty in utilizing butane and air mixtures in appliances made to burn manufactured gas was the conversion of the water heater (storage type) equipped with the horseshoe burner to butane and air.

A small water storage heater with a single burner was filled with cold water. The

best adjustment of the orifice and primary air having been obtained, the gas was turned on and a definite volume of gas was burned. The water was emptied through a line in the bottom of the tank and weighed. A thermometer in the outlet line was read every 15 seconds. The product of the weight of water and the mean rise of temperature gave the number of B.t.u. utilized, and this, divided by the product of the cubic feet of gas and its known heating value, was equal to the thermal efficiency of utilization.

The normal burner using butane and air is thought unsuited to burn this mixture. The time of heating the water is much too long and would bring down a flood of complaints. A comparison of the time shows that using butane and air, it would require approximately twice as long to heat a given amount of water to the same temperature as it would by using manufactured gas. The adjustment on the butane and air mixture was as perfect as could be obtained without making radical changes in the design of the mixing tube and the burner ports.

After the above tests several improvements were made on the burner, looking toward the possibility of the more efficient utilization of butane and air mixtures and also the changing from manufactured gas to butane-air and vice versa without loss either in efficiency or time.

*Water Heater with Special Screen Burner:* Finding that the ordinary type of burner, although satisfactory for manufactured gas, would not do for butane-air of the same heating value, a satisfactory burner was made by stopping all of the ports on the regular burner, welding on three ¾-inch couplings, and covering the tops of these couplings with a double layer of 30-mesh brass gauze. The burner was similar in design to the nickel grid burner described below (q. v.). It was then found possible to pass much gas, to inject a suitable amount of primary air, and to utilize it in a hot, lively flame that did not flare back nor leave the burners. This burner was equally suitable, with slight adjustments to the gas orifice needle valve and the primary air shutter, for manufactured gas or butane-air, and the thermal efficiency was nearly the same in each case.

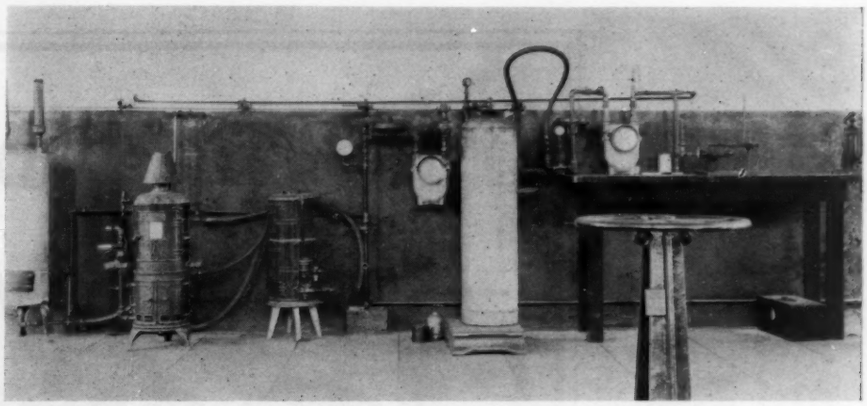


*Fig. 4. Test bench.*

*Water Heater and Special Burner with Nickel Grids:* The improvised burner described in the last paragraph was so successful that a more sturdy type was constructed, replacing the brass screens in the couplings with nickel grids from Fisher Laboratory burners.

*Cottage Type Instantaneous Water Heater:* Special utilization tests were made on a water heater using screen type burners, to determine what changes would be necessary in the burner design to utilize butane and air. The burner was properly designed for manufactured gas. Tests were made in

*(Continued on Page 56)*

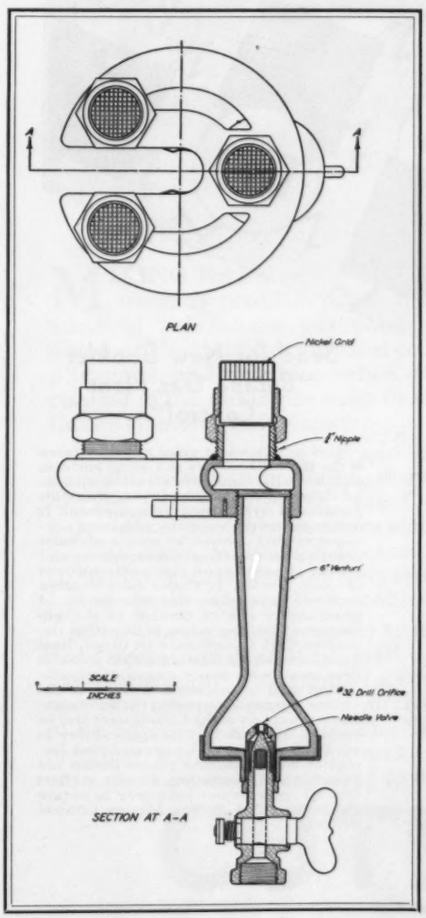



*Fig. 5. Experimental burner for butane and air mixtures.*

**Table No. 5. Summary of Tests on Standard Water Heater with Special Screen Burner.**

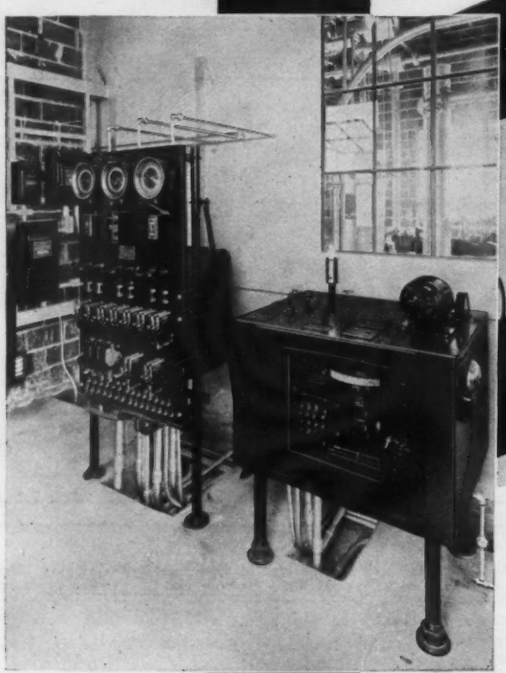
| Test No. | 116 | 117 | 118 |
|---|---|---|---|
| Kind of gas | Butane-Air | Butane-Air | Mfd. Gas |
| Per cent butane in mixture | 17.78 | 17.78 | |
| Per cent air in mixture | 82.22 | 82.22 | |
| B.t.u. of mixture | 580 | 555 | 531 |
| Utilization Tests: | | | |
| Kind of appliance | Standard Heater | | |
| Type of burner | Special Burner with 3¾" nipples and double screen. | | |
| Burner adjusted to | Butane-Air | Butane-Air | Mfd. Gas |
| Orifice suitable for | Butane-Air | Butane-Air | Mfd. Gas |
| Primary air adjusted | Yes | Yes | Yes |
| Test Data: | | | |
| Pounds water, net | 95.25 | 96.0 | 96.0 |
| Initial water temperature | 72. | 68. | 68. |
| Final water temperature | 145.0 | 156.4 | 154.0 |
| Net rise temperature | 73. | 88.4 | 86. |
| Cubic feet gas used | 25.136 | 29.87 | 29.84 |
| Rate of gas flow, cu. ft. per hour | 49.4 | 48.7 | 69.3 |
| Time for heating, minutes | 30.5 | 36.8 | 25.8 |
| Efficiency, thermal, per cent | 47.72 | 51.2 | 52.2 |

**Table No. 6. Summary of Tests on Standard Water Heater (Storage Type), Using Manufactured Gas and Butane-Air. Equipped with Special Type Burner (Fisher Nickel Grids, etc.)**

| Test No. | 144 | 146 | 147 | 145 | 148 |
|---|---|---|---|---|---|
| Kind of Gas | Butane-Air | Butane-Air | Butane-Air | Butane-Air | Butane-Air |
| Per cent butane in mixture | 16.85 | 16.85 | 16.85 | | |
| Per cent air in mixture | 83.15 | 83.15 | 83.15 | | |
| B.t.u. of mixture (calorimeter tests) | 540. | 547. | 555. | 544. | 560. |
| Utilization Tests: | | | | | |
| Kind of appliance | Standard Storage Type Water Heater | | | | |
| Type or burner | Special Type Burner with Special Nickel Grids | | | | |
| Burner adjusted to burn | Butane-Air | Butane-Air | Butane-Air | Mfd. Gas | Mfd. Gas |
| Orifice suitable for | Butane-Air, also Manufactured Gas | | | | |
| Primary air adjusted | | | | | |
| Test Data: | | | | | |
| Pounds water, net | 96.0 | 95.0 | 96.25 | 96.25 | 95.75 |
| Initial water temperature | 80.0 | 79.0 | 74.0 | 80.0 | 74.0 |
| Final water temperature | 128.0 | 140.0 | 137.0 | 133.0 | 136.3 |
| Net rise—temperature | 48.0 | 61.0 | 63.0 | 53.0 | 62.3 |
| Cu. ft. gas used | 18.0 | 20.0 | 20.0 | 18.0 | 20.0 |
| Rate of gas flow, cu. ft. per hour | 30.8 | 45.9 | 46.4 | 22.8 | 49.0 |

# How to Mix Butane
# —IN ONE WORD—
# "CALORIMIXER"

**AUTOMATIC!**
**ACCURATE!**
**INSTANT!**
**DEPENDABLE!**

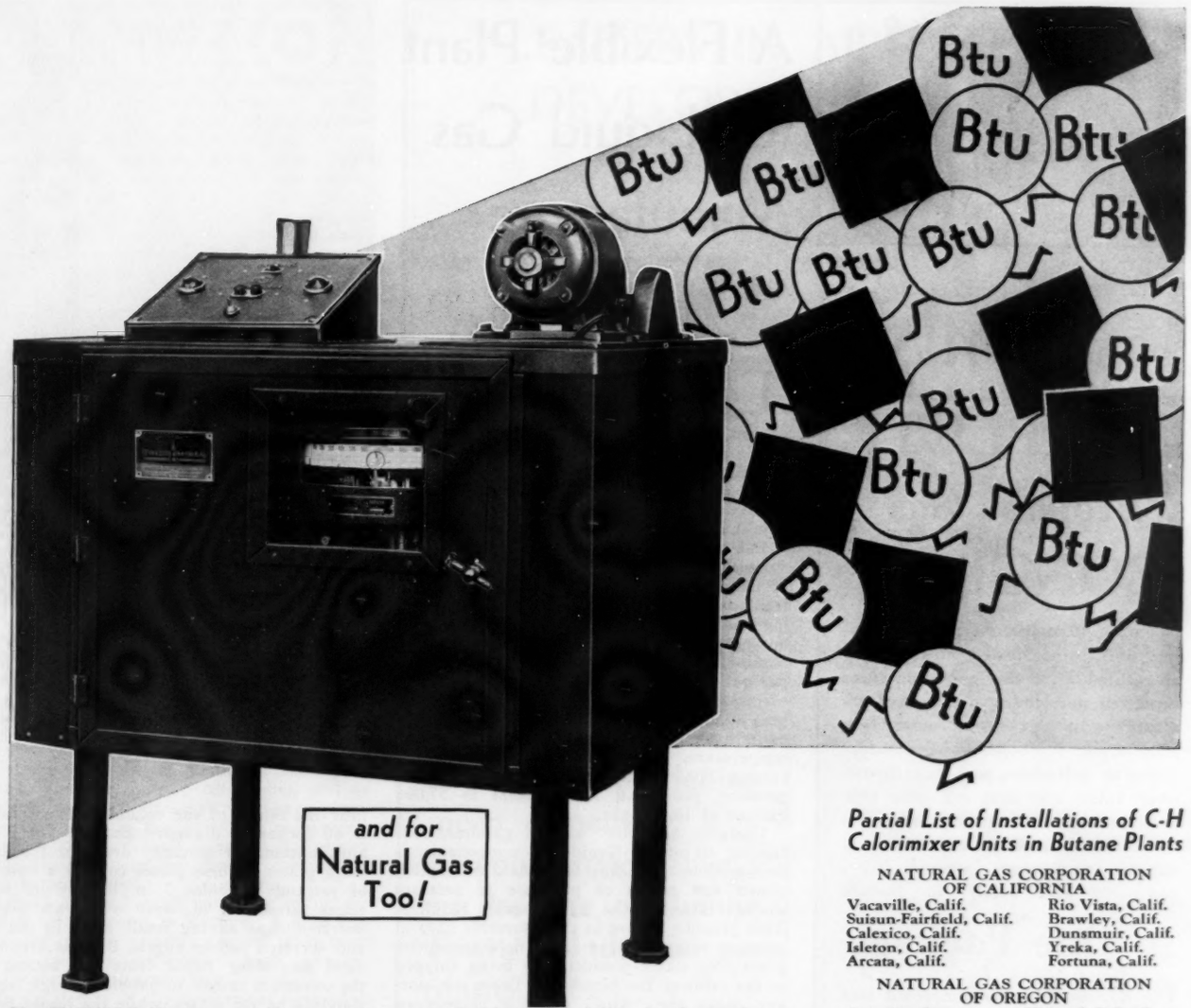


*This Calorimixer is in one of the butane gas plants designed and erected by Thebo, Starr and Anderton, Inc. The Calorimixer combined with the C-H Control Board operates this plant automatically. The board contains the pressure regulators, starters, relays, etc., which automatically start or stop gas-making units, as required. The C-H Signal System promptly reports any irregularities in the operation of the plant.*

## *Send for New Booklet "Butane Gas Plant Control"*

This new booklet gives a brief picture of the Butane Industry as a going business and shows the requirements of the successful Butane plant, supplementing this with pictures of arrangement of equipment. It demonstrates the necessity of having *adequate* mixing control, by means of charts pointing out the effect of temperature and gravity changes upon the satisfactoriness of your service. It shows how *modern* methods have taken the guesswork and unreliability out of control of the all-important heating value. It describes the *modern* C-H Calorimixer in detail, how *by measuring of heating value alone* it does away with many causes of dissatisfaction and unsuccessful service. It describes the quick response, the fully automatic operation of the Calorimixer and its control, its flexibility, its applicability to *all* Butane plants. The ground-plan layouts of typical Butane plants shown are valuable and interesting. Finally, a chart lists all information necessary to secure the proper C-H Butane Mixing Control System.

C-H




MIXING Butane — the one outstanding problem in the operation of the Butane gas plant—is accomplished without the usual complications and troubles when the control of the mixing is done by the Cutler-Hammer Calorimixer.

Built with the same rugged dependability which has won renown for the C-H Calorimeter, the C-H Calorimixer controls the entire plant, automatically, faultlessly; because it controls the mixing on the only satisfactory basis—that of B.t.u. content.

B.t.u. content is held rigidly to the predetermined standard, without hand operation. Variations in content immediately cause the mixture to be adjusted accordingly. The Calorimixer starts up the gas-making units or stops them, according to the need. If power fails, it shuts down the plant, and flashes a signal.

The Calorimixer is compact, requiring little space. It is adjustable to suit all requirements. It serves in big plants and small; for a complete and automatic small-town Butane gas plant, only the C-H Calorimixer System, a small building, gas tanks, pumps and compressors are necessary.

The trend toward the C-H Calorimixer is nation-wide and gathering momentum. It merits your attention if you want to keep the final customer satisfied with the gas you furnish to her. Send for the new descriptive booklet. CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus,* 1273 St. Paul Ave., Milwaukee, Wis.

***Partial List of Installations of C-H Calorimixer Units in Butane Plants***

NATURAL GAS CORPORATION OF CALIFORNIA
Vacaville, Calif. — Rio Vista, Calif.
Suisun-Fairfield, Calif. — Brawley, Calif.
Calexico, Calif. — Dunsmuir, Calif.
Isleton, Calif. — Yreka, Calif.
Arcata, Calif. — Fortuna, Calif.

NATURAL GAS CORPORATION OF OREGON
Coquille, Ore. — Klamath Falls, Ore.
La Grande, Ore. — Bend, Ore.
The Dalles, Ore. — Cottage Grove, Ore.

NATURAL GAS CORPORATION OF WASHINGTON
Port Townsend, Wash. — Anacortes, Wash.
Camas, Wash. — Shelton, Wash.
Port Angeles, Wash.

TENNESSEE GAS COMPANY
Maryville, Tenn. — Morristown, Tenn.
Columbia, Tenn. — Union City, Tenn.
Shelbyville, Tenn. — Murfreesboro, Tenn.

SOUTHEASTERN ILLINOIS GAS CO.
Harrisburg, Ill. Metropolis, Ill. Eldorado, Ill.

SOUTHWESTERN WISCONSIN GAS COMPANY
Sparta, Wis. — Tomah, Wis.

CENTRAL WISCONSIN GAS CO.
Waupaca, Wis.

CAROLINA CENTRAL GAS CO.
Hendersonville, N. C.

NORTHSHORE GAS COMPANY
Ipswich, Mass.

PEOPLE'S LIGHT COMPANY
Davenport, Ia.

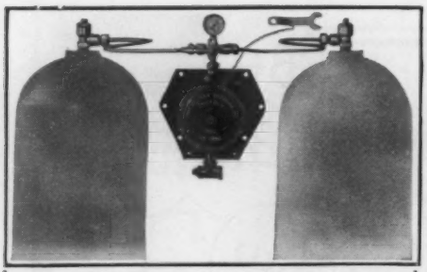
IOWA RAILWAY & LIGHT CORP'N
Mount Vernon, Ia.

# CUTLER HAMMER

C-H

## *Automatic Gas Mixing Control System*

A-40



The *Only* COMPLETE Propane Gas CONTROL

**A complete manifold and regulating unit, work tested and factory assembled . . . the only *complete* liquefied petroleum gas control assembly you can buy; fortunately Rego-made . . consists of connections to cylinders, a 2-way throw-over valve (to shut off one side automatically when the other is opened), a regulator, mercury seal, supply of mercury, wrench . . . complete and ready to install.**

**In One Package**

**The REGO complete manifold and control unit is factory assembled and tested under actual working conditions . . . then packed in a substantial re-shipping carton.**

**Ready to Ship *for* Field Installation**

**Sell the job . . . ship the equipment, including the REGO carton . . . then send a man out to hook it up. That's what REGO means to the Liquefied Petroleum Industry!**

***Write*** **We have a wealth of data on marketing, and distribution; complete files on research and application. Ask us any question without obligation.**

**The Bastian-Blessing Co.**
**254 East Ontario St.**
**Chicago, Ill.**

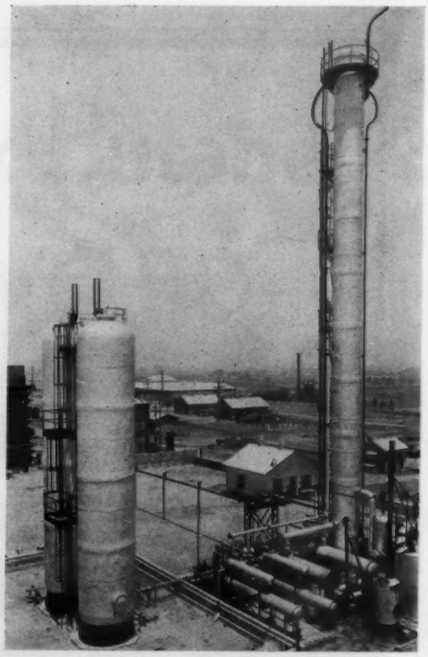
# A Flexible Plant for Liquid Gas Manufacture

*By* F. O. OLMSTED
*Union Oil Company of California*

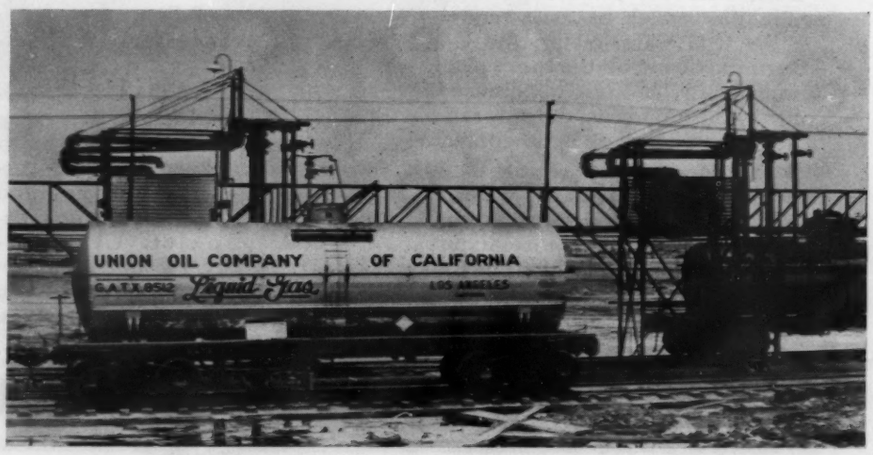
THE early part of last month marked the completion of a modern plant for the manufacture of liquefied petroleum gas on the Pacific Coast. This plant, built by the Union Oil Company of California at its Los Angeles refinery, located on the West Basin of Los Angeles Harbor, incorporates a number of features in its design which should interest users of these gases.

The plant is capable of a wide degree of flexibility. One of its unique features is that of taking all commercial cuts of liquid gas from one stabilizing column, the cuts ranging from almost pure propane to almost pure butane. The calorific value of the products obtainable may be varied from 95,000 B.t.u.'s per gallon to 102,000 B.t.u.'s per gallon, with corresponding vapor pressures of 200 pounds per square inch absolute at 100° F. to 70 pounds per square inch absolute at the same temperature. The plant is capable of processing 250,000 gallons per day of natural gasoline, producing from 25,000 to 35,000 gallons of liquid gas.

Unstable, or "wild" natural gasoline, containing all of the liquid gas components, is delivered by pipe line from field absorption plants and points of purchase to pressure storage tanks at the Los Angeles Refinery. This practice is new in that formerly natural gasoline was stabilized at the field absorption plants, the stable product only being shipped to the refinery for blending. From the storage tanks the "wild" gasoline is pumped through heat exchangers where it is heated by the hot stabilized gasoline from the bottom of the stabilizing column. Additional heat is supplied by similar heat exchangers, in which the heating medium is recirculated gas oil. From this point the hot feed passes to the fractionating or stabilizing column, entering at one of several connections located near the center of the column. The column is 60 inches in diameter and 97 feet high, and contains 50 specially designed fractionating plates. These plates contain a number of rectangular holes 7 in. by 1½ in. with edges raised 3⅞ in., over which are placed inverted cups having small holes in the top and serrated bottom edges. By this arrangement ascending vapor from the bottom of the column is caused to bubble through liquid standing on the plates, while the liquid flows successively downward from plate to plate. A stream of ascending vapor is created by circulating a portion of the stabilized gasoline from the bottom of the column through a tubular heat exchanger in which the heating medium is gas oil which has been heated in a direct fired heater and is pumped in a closed circuit through the fired heater and



*Plant for manufacture of liquefied petroleum gas, located at Los Angeles refinery of Union Oil Company of California. Stabilizing column at right is 97 feet high, and 60 inches in diameter. Liquid gas storage tanks are seen at the left.*




*Union Oil Company of California tank car, used in transporting liquefied petroleum gas. Car is built to I.C.C.-105 specifications.*

heat exchanger. A stream of descending liquid from the top of the column, called reflux, is provided by condensing a portion of the vapor leaving the top of the column in a condenser located in a cooling tower. The liquid so condensed is pumped to the top of the column entering on the topmost plate. The remaining uncondensed vapor, consisting of material lighter than liquid gas, is mixed with natural gas and burned as refinery fuel.

The feed enters the column at a temperature of 250° F. to 300° F. Stabilized gasoline leaves the bottom at 365° F. and vapor leaves the top at about 160° F. Operating pressure is 300 pounds per square inch.

The fractionating process which takes place in the column is essentially a simple one. The hot vapor from the bottom, consisting of the more volatile components of the stabilized gasoline, is partially condensed on the bottom plate by the liquid on that plate and at the same time a portion of the liquid is vaporized. The vapor condensed is the heaviest or least volatile portion of the ascending vapor. The liquid vaporized is the lighest or most volatile portion of the descending liquid. The result of this transfer, which takes place on every plate in the column, is that the ascending vapor becomes progressively lighter in flowing upward through the series of plates, while the liquid passing downward becomes progressively heavier. On plates near the top of the column will be found liquid which is essentially propane. Farther down a point will be found where the liquid is essentially butane and in between the liquid will contain various proportions of each. In addition there will always be very small proportions of the more volatile ethane on the upper plates where propane predominates and of the less volatile pentane on the lower plates where butane is the principle component. Thus, by tapping the column at the proper point, liquid gas of any desired composition may be withdrawn.

Liquid gas and stable natural gasoline are cooled before going to storage. Liquid gas is stored in high pressure vertical tanks from which specially constructed high pressure tank cars or tank trucks are loaded.

In the design of the mechanical equipment a great deal of stress was laid on safety of operation. The fired heater is isolated from the column and heat exchangers, being about 100 yards away. The feed tanks are located at a considerable distance from the plant and every possible precaution was taken to reduce operating hazards to a minimum.

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### Detroit Lakes Gas Co. Plant Operating—$10,000 in Appliances Sold

Detroit Lakes Gas Co., subsidiary of Municipalities Gas Corp., Minneapolis, Minn., reports that the propane plant at Detroit Lakes is completed, and that 90 per cent of the distribution system is in service. The remainder of the system will be in operation by the second week in July. The company distributes undiluted 2550 B.t.u. propane gas.

More than $10,000 in gas appliances have been sold in Detroit Lakes since the beginning of service. The town has a population of approximately 3,700.

### Cutler-Hammer, Inc., Moves Atlanta, Ga., Offices

Effective June 1, the Atlanta, Ga., sales office of Cutler-Hammer, Inc., will be located at 133 Cone Street, N.W., on the street floor. These new quarters will also include warehouse facilities. A. C. Gibson is manager of the Atlanta district for the company.


LEADERS IN AIR BUTANE DEVELOPMENT ON THE PACIFIC COAST

▼

NATURAL GAS CORPORATION OF CALIFORNIA
NATURAL GAS CORPORATION OF WASHINGTON
NATURAL GAS CORPORATION OF OREGON
San Francisco and Portland

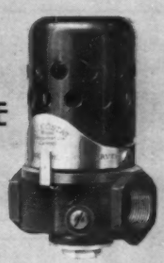
PB

60 years of engineering and manufacturing background in air-gas proportioning mean something. + + At your service always on Propane or Butane Town or Industrial gas plants. + + +

PARSONS ENGINEERING COMPANY
525 Market Street, San Francisco
Affiliated with The C. M. Kemp Mfg. Co.

The WILCOLATOR OVEN HEAT CONTROL

The WILCOSTAT ROOM TEMPERATURE CONTROL



The WILCOLATOR Co. Newark N.J.

GROBLE REGULATORS & GOVERNORS

*Complete Line of Regulators for*

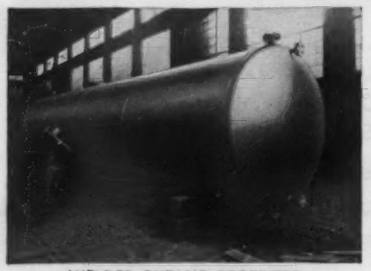
Natural, Manufactured, Butane and Propane Gas

*Pacific Coast Representative,*

T. G. ARROWSMITH COMPANY,
661 Howard Street San Francisco, Calif.
Phone Garfield 8419

GROBLE GAS REGULATOR COMPANY
*Office and Factory: Anderson, Indiana*

**.Biggs. Welded Vessels**



WELDED BUTANE RECEIVERS

BIGGS Welded Butane Receivers effect a real economy by eliminating the maintenance trouble and expense usually encountered under severe working conditions. The Biggs weld is ductile, uniform, and stronger than the plate itself. Data upon request.

THE BIGGS BOILER WORKS CO., Akron, Ohio


# Adapting Appliances to Butane and Air

*(Continued from Page 51)*

similar fashion as for the storage heater (q.v.).

Butane-air and manufactured gas of about 550 B.t.u. both burned well without adjustment in this heater, due doubtless to the construction of the burner, which resembled the nickel grid burner described above. A summary of the efficiencies of utilization is given in Table No. 7.

**Table No. 7**

| Test No. | Efficiency Per Cent Butane-Air | Mfd. Gas |
|---|---|---|
| 110 | 57.3 | |
| 111 | 63.0 | |
| 129 | 60.5 | |
| 130 | | 52.1 |
| 131 | | 54.1 |
| 132 | 60.6 | |
| 133 | 53.4 | |
| 134 | 52.6 | |
| 135 | 55.7 | |
| Average | 57.6 | 53.1 |

In this case, the efficiency of the butane-air gas was 4.5 per cent greater than in the case of manufactured oil gas.

*Conclusion:* Our tests were to determine the ability of appliances now using our manufactured oil gas to utilize butane-air gas with only minor adjustments and small expense for labor and material.

Experiments with both the long and short mixing tube burners of the common type of gas range, show that either burner will be suitable for butane and air or manufactured gas with only slight changes in the air adjustment. The butane and air mixtures in most cases gave higher efficiencies. We found that in the use of any type of burner the limiting factor in the size of port holes is approximately ⅛ inch. Any port hole larger than ⅛ inch will cause the flame to fire back into the mixing tube.

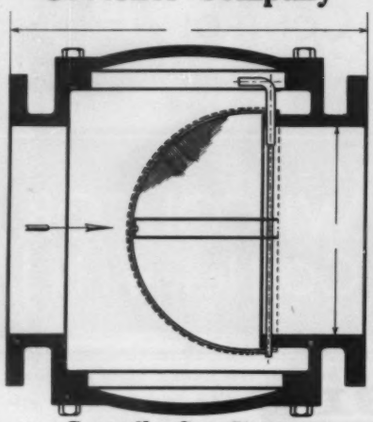
Experiments with the type of storage water heater which utilizes a horseshoe type of burner, show that this type of burner is not suited to burn butane and air without some radical change in design. After many trials we were able to design a special burner utilizing three nickel grids from the Fisher Laboratory burner, with which we were able to burn either manufactured oil gas or butane and air without any apparent change either in efficiency or loss in time required to heat up a given amount of water.

The type of heaters using screen type burners gave us no trouble when used with butane and air. We were able to change from one gas to the other with but little loss in temperature rise due to the ability of the manufactured gas orifice to pass more gas when used with manufactured gas than when used with butane and air.

Although our tests are not complete, we believe we are safe in stating that the following conclusions hold:

1. The gas range is adjustable to either butane and air or manufactured oil gas without any great deal of adjustment necessary.
2. Water heaters using horseshoe type burners require a special burner.
3. Water heaters using screen burners (if adjusted to manufactured gas) burn butane and air or manufactured oil gas equally well.


**Connelly Iron Sponge & Governor Company**



**Connelly Gas Screen**

**GOVERNORS**

Automatic Balance
District
High or Low Pressure
Back Pressure Valves
Photometers
Testers
Siphon Pressure Gauges
Telemetric Gauges
Street Dept. Requisites
Lockwood Safety Valves
Gas Works Equipment
Gas Screens
Gas Tape
Combination Valve
Caloroptic Calorimeter
Counter-Balance
Man Hole Cover
Safety-Syphon Seal

*Write for Bulletins*

**ELIZABETH NEW YORK CHICAGO**


## New Plan for Propane Service Inaugurated by Lone Star

The Stargas division of the Lone Star Gas Co., Dallas, Texas, has recently inaugurated a sales plan which permits customers to install propane gas at a cost considerably less than ordinary pipe line service.

Previously, the customer bought all the equipment necessary for installation of drum gas service, but under the new plan all regulators, valves, and cabinets are the property of the company, which makes the installation at a charge of $7.50, plus a service charge of 75 cents per month, payable annually in advance. The customers pay for house-piping, and the cost of the cylinders of propane varies from $6.30 to $10, depending on the manner of delivery and the amount purchased per month.

The new plan, which saves the customers approximately $80, has been successfully tried by the Dallas Gas Co. and is being inaugurated by the Texas Cities Gas Co., the Municipal Gas Co., and the Fort Worth division of the Lone Star Gas Co.

## New Booklet on Butane Gas Plant Control

A new booklet, titled "Butane Gas Plant Control," has just been published by Cutler-Hammer, Inc., Milwaukee, Wis., manufacturer of gas measuring and control instruments. The booklet describes automatic operation of butane gas plants. Photographs show typical installations and details of the apparatus used in the system. The function, operation and application of the C-H Calorimixer for controlling the mixing of butane gas is also described. The C-H signal system for warning of irregularities in the operation of the plant is also explained.

Charts and equations demonstrate the changes in gas quality and how they affect mixing, and ground-plan layouts of typical butane plants are given. A copy of the brochure will be sent upon receipt of a request addressed to Cutler-Hammer, Inc., 9-G North 12th St., Milwaukee, Wis.

## Butane Plant at Fitchburg for Manufacturing Purposes

Simonds Saw and Steel Co. is constructing a butane plant at Fitchburg, Mass., which is believed to be the first application of butane for manufacturing purposes in New England, and the first application east of Detroit using 3,200 B.t.u. mixture direct. The plant consists of an installation of 30,000 gallons capacity, with two equal storage tanks installed underground.

## Northland Utilities Completes Plant at Cloquet, Minn.

F. B. Scott, engineer for the Northland Utilities Co., Chisholm, reports that the butane-air gas plant at Cloquet was completed during the week of June 22. The company is now beginning the installation of distribution mains, and expects to serve the town by the first part of August.

## Plant at Ida Grove to go Into Operation Early in July

Iowa Public Service Co., Sioux City, Iowa, plans to put its butane plant at Ida Grove, Iowa, into operation some time during the first part of July.

### Charles Scherenzell Sales Supv. for Two Natural Gas Corps.

Charles Scherenzell has recently been appointed sales supervisor for Natural Gas Corp. of Oregon and Natural Gas Corp. of Washington, according to an announcement just made by A. E. Strong, general manager of the two companies.

Mr. Scherenzell has been acting in a similar capacity for Natural Gas Corp. of Oregon for the past several months, but now is also covering the Washington properties, which were formerly taken care of by F. R. Rudisill.

### National Gas & Utilities Corp. Building Plant at Hartsville

National Gas & Utilities Corp. of New York City has commenced the construction of a butane gas plant at Hartsville, South Carolina, which will be operated as the Hartsville Gas Co. Johnson Church & Co. has charge of the construction of the plant, which is designed after Philfuels specifications. Plans call for the completion of the plant by August 1. Approximately 700 meters are to be served by the unit.

### Pelican Rapids Franchise to Municipalities Gas Corp.

Municipalities Gas Corp., Minneapolis, Minn., late in June secured a 20-year franchise for installation and operation of a propane plant in Pelican Rapids, Minn. The franchise will be assigned to the Detroit Lakes Gas Co. The plant will probably be in operation by the last of September.

### Four Plants in Operation for Southwestern Illinois Gas Co.

Southwestern Illinois Gas Co., Harrisburg, Ill., now has butane plants in operation in Vandalia, Harrisburg, Eldorado and Metropolis, Ill. The company reports that since beginning the operation of these plants the growth of business has been very satisfactory.

### To Call Franchise Election At Flagstaff, Ariz.

It is expected that a special election will be held within the next 60 days on the application of H. G. Laub for a franchise for the service of butane gas in Flagstaff, Ariz. Mr. Laub and associates recently purchased the manufactured gas plant at Winslow, Ariz.

### Eastern Shore Gas Co. Begins Operation of Pocomoke City Plant

The butane-air gas plant of the Eastern Shore Gas Co. at Pocomoke City, Maryland, was put into operation the first week in June. The high pressure distribution system constructed in conjunction with the plant will supply gas to about 500 meters. R. J. Minck is general manager of the Eastern Shore Gas Co.

### Great Northern Utilities, Inc. Has Two Plants Under Way

Great Northern Utilities, Inc., is constructing plants for the distribution of butane gas at Watseka, Ill., and Mt. Vernon, Ind. The system at Watseka will be for high pressure distribution.

### Baby Chicks Are Saved By Emergency Installation

One thousand baby chicks, now busy pecking corn near Fort Worth, Texas, owe their lives to "bottled" gas. During the last week of a recent hatch, eggs in a gas-fired incubator owned by a main line consumer of the Community Natural Gas Co., were threatened with disaster when the gas company announced a five-hour shut down for repairs.

A drum of "Stargas," compressed natural gas marketed by Lone Star Gas Co., was connected to the incubator. The line was shut down, the repair work finished, and the chicks were saved.

### Limits of Inflammability Of Gases and Vapors

The publication of a revised and enlarged edition of Bulletin 279, "Limits of Inflammability of Gases and Vapors," by H. F. Coward and G. W. Jones, is announced by the United States Bureau of Mines, Department of Commerce. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a price of 20 cents.

### J. H. Dunbar Now With Natural Gas Corp. of Wash.

J. H. Dunbar is the newly appointed local representative for Natural Gas Corp. of Washington at Camas. Mr. Dunbar was formerly sales supervisor for Western Gas Co. of Washington, and took over his new duties on June 15.

STANDARD OIL COMPANY
OF CALIFORNIA

*Announces*

**BU-GAS**

**A COMMERCIAL *BUTANE* OF EXCEPTIONAL PURITY**

The high calorific value of Bu-Gas and its comparatively low vapor pressure result in economical storage and adapt it particularly—

**FOR GAS MANUFACTURE OR ENRICHMENT.**

**Any Standard Oil Representative will gladly furnish full information.**

**STANDARD OIL COMPANY OF CALIFORNIA**

| BOILER DATA | | BURNER DATA | | | FURNACE DATA | | | | | TEST DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TYPE OR MAKE | RATING H.P. | NO. OF BURNERS | TYPE | MAKE | WIDTH | HEIGHT | DEPTH | FURNACE VOLUME | VOL. PER H.P. | GAS PRESS. | $CO_2$ % | $O_2$ % | CO % | STACK °F | CF/hr. |
| Horiz. Return Tube | 45 | 1 | 2X | Webster | 5'0" | 3'0" | 14'0" | 210 c.f. | 4.6 | | 9.6 | 3.8 | | 460 | 3210 |
| Scotch Marine | 50 | 1 | #11 | N.G.E. | 2'0" diam. | | 5'0" | 15.7 | .31 | 3.6 | 11.1 | 1.8 | | 680 | 2240 |
| Horiz. Return Tube | 75 | 1 | A | N.G.E. | 4'0" | 4'0" | 18'0" | 288 | 3.85 | 6.7 | 11.6 | 0.8 | | 580 | 6400 |
| Horiz. Return Tube | 125 | 2 | 5X | Webster | 5'6" | 5'0" | 16'0" | 440 | 3.5 | 3.3 | 10.2 | 3.3 | | 520 | 10930 |
| Horiz. Return Tube | 150 | 1 | 6X | Webster | 6'0" | 6'0" | 16'0" | 576 | 3.8 | 3.4 | 9.0 | 5.4 | | 540 | 9130 |
| Horiz. Water Tube | 150 | 2 | A | N.G.E. | 5'6" | 5'0" | 18'0" | 495 | 3.3 | 1.9 | 11.6 | 0.9 | | 445 | 6990 |
| Horiz. Return Tube | 150 | 2 | A | N.G.E. | 8'0" | 6'0" | 16'0" | 768 | 5.1 | 4.0 | 11.2 | 1.6 | | 555 | 9150 |
| Horiz. Return Tube | 150 | 2 | A | N.G.E. | 6'0" | 6'0" | 20'0" | 720 | 4.8 | 3.0 | 11.6 | 0.9 | | 475 | 8230 |
| Babcock & Wilcox | 175 | 1 | 6X | Webster | 5'6" | 5'6" | 8'0" | 286 | 1.63 | 2.75 | 10.5 | 2.3 | | 520 | 8850 |
| Heine | 225 | 2 | A | N.G.E. | 4'6" | 4'6" | 10'0" | 270 | 1.2 | 1.8 | 9.2 | 5.1 | | 415 | 6086 |
| Badenhausen | 400 | 9 | A | N.G.E. | 12'0" | 12'0" | 7'0" | 880 | 2.2 | 3.0 | 11.2 | 1.6 | | 695 | 33400 |
| | | | | | | | | | | 2.5 | 10.6 | 2.6 | | 630 | 26100 |
| | | | | | | | | | | 1.5 | 11.6 | 1.1 | | 535 | 22000 |
| | | | | | | | | | | 1.0 | 11.4 | 1.2 | | 500 | 18200 |

*Table No. 1. Representative data on gas-fired laundry boilers.*

# Converting the Laundry to Natural Gas

*(Continued from Page 28)*

unable to regain it until the load goes off. Consequently, if a recording pressure guage were used, a jagged line up and down would result.

It certainly means a great deal to plant operators to be able to maintain constant steam pressure, and gas fuel will do this. The equipment, of course, is highly important; it must be well adapted to the requirements. The fuel regulator must respond readily to variation in steam pressure, and in conjunction with this must be burners of a type which will take a maximum or minimum amount of gas and still effect good combustion. It has been surprising in many cases to see engineers and firemen who are used to having the steam pressure go up and down with the load stand in amazement while the gas burners pick up the peak load and carry it without loss of pressure. Ability to maintain constant steam pressures, then, is a point to remember when selecting burner equipment.

Another point in connection with laundries, although it is not the case in all instances, is that as a general rule boilers are operated at overloads. Even in cases where there may be one or two additional boilers the operators seem to derive a certain satisfaction from carrying the load on one boiler if it is at all possible, and it is a revelation in some cases to see the high ratings that are obtained with small furnaces.

In one installation, this overloading proved advantageous to the obtaining of a consumer. This particular plant had one 150 H.R.T. and one 250 Heine and one 400 H.P. water tube Badenhausen. On oil fire it was necessary to use the 250 and the 400 H.P. units. On conversion it was contemplated to do likewise, though it was known that the firm had intended to install an additional 400 H.P. boiler as standby and eliminate the two smaller boilers.

On previous tests the 400 H.P. boiler had shown itself capable of carrying an overload to the extent of producing 750 H.P., though this was inadequate to supply the demands of the entire plant. Plans for the new boiler were held in abeyance, however, due in part to the conversion of the present boiler and to other plant expansion proposals. Immediately upon completion of the conversion, however, great concern was felt as to whether or not one boiler would carry the plant.

The one boiler did actually carry this load, producing approximately 925 H.P. The only change made at the time of conversion was to remove a flash wall which provided about 125 cubic feet more furnace volume. Needless to say, the fact that the reserve capacity was there, coupled with the fact that it was possible to maintain constant steam pressures through the use of gas fuel, had considerable to do with the satisfaction that the consumer felt in making the investment in gas burning equipment. It also released the capital that had been assigned to the proposed additional boiler installation for other pending plant improvements until growth should make it necessary to install the additional capacity.

In line with excessive overloads is the problem of furnace maintenance. Without going into detail it may be stated as fact that gas does not have the deteriorating effect that liquid fuels do. Plant operators quickly appreciate the condition of the brick in the furnace after firing with natural gas. In plants where liquid fuel is burned, burnt out brick work must be replaced at frequent intervals.

Natural gas, with its characteristics of flexibility and adaptability, together with its low cost, has made itself a fitting part of any progressive laundry plant program. Cleanliness is an advantage that is especially noticeable where gas is burned, although the boiler room operator does not appreciate it until after he has had an efficient and clean gas installation. It is gratifying to witness the increased interest on the part of the boiler room attendants in maintaining the good appearance of their boilers after gas has been installed.

Nearly all types of boilers are being used in laundries at the present time. Table No. 1, giving a tabulation of a cross section of laundry boilers, might prove to be of some benefit in showing the pertinent facts regarding burner installations, furnace data and gas analysis.

# Change-Over Methods at Bismarck, N. D.

*(Continued from Page 27)*

sisting of the following: 190 ranges, 29 hot plates, 127 water heaters, 15 radiant-type heaters, 15 Bunsen burners, 5 soldering furnaces, 5 curling irons, 4 soldering torches.

In addition to these we had the equipment in four restaurants. The change-over work on the top of the ranges, hot plates, water heaters and miscellaneous equipment was completed the first day, with 18 men doing the actual conversion work. The second day we finished the ovens and cleaned up most of the "not-at-homes" from the previous day. The third day we checked over all appliances.

The time required for conversion of the top burners of a range is about 15 minutes for the average man, 15 minutes on water heaters and the same on most hot plates and laundry stoves. It took about 40 minutes to convert the average oven with oven control. Without oven control the conversion was made in about half this time.

The first day of the change-over we had about 68 phone calls, most of these calling for information in regard to when a man would be there to do the work. A few calls were received in regard to blue tags left at places where the customer was not at home. The second day we received 40 calls. The majority of these asked when ovens would be converted. Seven calls were received asking for readjustment of appliances. The third day we received a number of calls where blue tags had been left. We received 25 calls asking for readjustment of appliances. Most of these calls were occasioned by the fact that the people were accustomed to a sharper and bluer flame than was produced with natural gas. Very few calls were received due to leaks being left by men doing the work.

The lighters and radiant-type burners were installed after the Bismarck change-over was completed. The lighters were installed at a labor cost of approximately 15c. The radiant-type burners were installed at a labor cost of approximately $1.75. A special service man was kept in Mandan for a week following the change-over, taking care of about 12 calls a day, which fell to 2 calls at the end of the week.

*Actual Work at Bismarck, N. D.:* The procedure used at Mandan was followed in Bismarck. Ten additional men were used. In Bismarck there were approximately 2,130 appliances to be converted, consisting of 850 ranges, 540 water heaters, 240 laundry stoves, 175 hot plates, 85 radiant-type heaters, 200 Bunsen burners.

These appliances, with the exception of the radiant-type heaters, were converted in five days.

Bismarck was divided into two sections for the change-over, one section comprising approximately 800 meters and the other section having about 600 meters. The cost of conversion in Bismarck was about the same per appliance as the cost in Mandan, and the

phone calls received were approximately the same per customer as those received in Mandan.

*General:* The men assigned to change-over work were given numbered badges with the company's name on them. They were also given identification cards. This was done to gain admittance to consumer's premises with as little difficulty as possible. As far as known, no employee was questioned in regard to his identity, although some of the work was performed as late as midnight. The contact between the company's customers and the employees on conversion work was excellent, not a single complaint regarding actions of men being reported.

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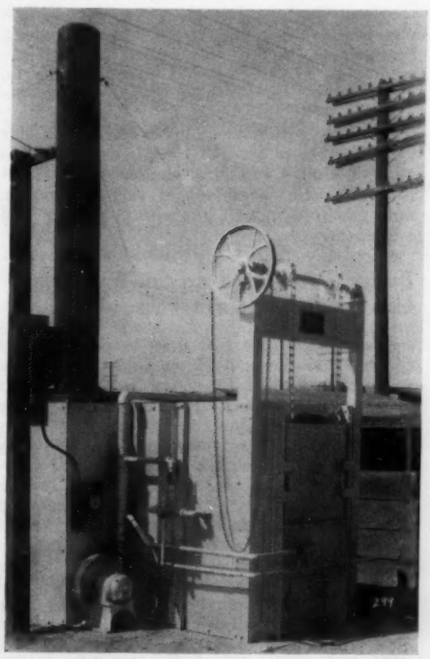
### Amarillo Gas Co. Offers Rate Reduction; Buys Huber Line

Amarillo Gas Co. has purchased the pipe line owned by Huber Petroleum Co., through which the city of Amarillo is being supplied with gas, and has announced a 27-cent maximum gas rate for the town. The company is also to take over all contracts which had been made by the city for supplying gas.

### Gas Crematory for Four-Footed Hit-and-Run Victims

A RECENT interesting natural gas installation is that of a dog and cat crematory at the city pound in Pomona, Calif.

Southern Counties Gas Co., of Los Angeles, maintaining district offices in Pomona, solved the problem of the disposal of the bodies of four-footed "hit and run" victims. Through the company's industrial department and an equipment manufacturer, an up to date crematory has been completed and fired with natural gas. From six to eight dogs a day find their last resting place in this sanitary incinerator. The installation is believed to be the first of its kind in the United States.



*Gas crematory for small animals, recently completed at Pomona, Calif.*

# New Mexico Gas for Arizona Centers

*(Continued from Page 23)*

Each station is provided with two 50 KW, 480 volt, three phase 60 cycle gas engine driven generators with the necessary switchboards and transformers for the lighting and power system. The ignition equipment includes storage batteries with motor generator charging equipment in duplicate.

The jacket water pumping equipment consists of four 4-inch single stage centrifugal pumps per station, each driven by a 15 h. p. squirrel cage induction motor. Two of these pumps take water from the cooling tower basin and pump it through the gas coolers, compressor cylinders and engine cylinders while the other two take the water from the cylinder overflows and elevate it over the cooling tower.

A 50,000 gallon elevated water tank is provided at each station with the overflow 60 feet above grade. A 5,000 gallon elevated tank is provided for drinking water and domestic use.

A cooling tower 18x43x35 feet high is installed at each station.

The machine tool equipment consists of a drill press, lathe, pipe machine, grinder and power hacksaw, all equipped with individual motor drive.

A 5-ton hand operated crane is installed in the compressor building.

All high pressure gas piping for Stations 1 and 2 is series 30, while series 40 is used for Stations 3 and 4. All valves and fittings are of cast or forged steel, no cast iron fittings or valves being used for this service. Welded construction is used for the high pressure gas piping.

At several of the compressor sites difficulty was encountered in obtaining a satisfactory supply of water. One well is 1240 feet deep with water standing 800 feet below the surface, and one well is over 1500 feet deep. Most of the water obtained will require treating to eliminate scale in engine and compression jackets, and zeolite system is being purchased for that purpose.

Ground was broken for Station No. 3 on March 1st, 1931, and the first compressor was run on gas on May 5, 1931.

*Mexican Extension*

A part of the project of the Western Gas Co. is the building of branch lines from its main line at Bisbee, south to the City of Cananea, in the State of Sonora, Mexico. Cananea is a thriving mining town of approximately 15,000 inhabitants. Its chief industry consists of the mines and smelters of the Cananea Consolidated Copper Co., S. A.

In connection with this project it was first necessary to obtain a federal concession from the Republic of Mexico. This concession was granted by the Mexican Government in November, 1930. Governor Francisco Elias of the State of Sonora, recognizing the importance of the industry to his state and the assistance which would help to mitigate the unemployment situation, cooperated in every way towards the organization of the Mexican subsidiary company and the obtaining of the concession from the Federal department. The Mexican corporation is known as Compania Occidental de Gas, S.A. Every department of the State Government cooperated cordially and enthusiastically with the Western Gas Co.'s representatives. In his preliminary work, Mr. Saenz, the present able secretary of Commerce, Industry and Labor of Mexico, likewise, also broke the customary maze of red tape which all of the applicants are compelled to contend with in dealing with the Federal departments of all Republics, and so expedited the application that the same was granted in the record time of five weeks. Every Federal department official in Mexico has assisted the company in every way possible towards the building of this line. The organization of the Mexican subsidiary company and the securing of the Federal concession was handled by Frank A. Liddell of the law firm of Huggins, Kayser & Liddell of Houston, general attorneys for the company.

# Review of the Month

*(Continued from Page 19)*

line from Oklahoma City field to Tulsa and points in other states to the north, Western Public Service Corp. now conducting surveys for a 20-inch carrier.

Several eastern states now have a natural gas story of their own to report. With heavy potential production newly developed in the Tioga area of Pennsylvania and the Wayne Dundee field in Yates and Schuyler counties, New York, projects are announced for taking natural gas to Syracuse and a number of other logical markets. Possibility arises that sufficient production will be developed to warrant seeking major metropolitan markets. Completion of the Columbia Gas & Electric Corp. system from Kentucky and West Virginia fields to Pennsylvania, announced for October 1, will see the consummation of the first important eastern link in the new natural gas extensions.

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### Continental Construction Corp. Moves Offices to Chicago, Ill.

Continental Construction Corp. and Texoma Natural Gas Co. announce the removal of their Kansas City general offices to the Civic Opera Building, 20 N. Wacker Drive, Chicago, Ill., effective June 25, 1931.

### So. Calif. Gas Co. Painting Holders in Azure Blue

Southern California Gas Co., headquartered at Los Angeles, is painting all holders in the Central, Eastern and Northern Divisions, applying an azure blue aluminum paint. That particular color was chosen because it does not radiate sunlight and tones in with the horizon. The company is using 4,800 gallons of paint on 1,092,500 square feet of surface.

### Wm. Deardorf Now Supt. of Clayton Gas Co., Clayton, N. M.

William Deardorf has been promoted to the position of superintendent of the Clayton Gas Co., Clayton, New Mexico, and the Texline plant of the Dalhart Gas Co., according to O. E. Duggins, division manager of six of Prairie Oil and Gas Co.'s properties in Texas and New Mexico.

## GAS APPLIANCE MERCHANDISING REVIEW

Refrigerators—Incinerators—Laundry Equipment

| COMPANY | REFRIGERATORS | | | PORTABLE INCINERATORS | | | CLOTHES DRYERS | | | WASHERS & IRONERS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sold 1930 | Sold 1929 | Quota 1931 | Sold 1930 | Sold 1929 | Quota 1931 | Sold 1930 | Sold 1929 | Quota 1931 | Sold 1930 | Sold 1929 | Quota 1931 |
| Metropolitan Utilities District, Omaha, Neb. | 78 | 12 | | 10 | 10 | | | 5 | | | | |
| Cimarron Utilities Co., Guyman, Okla. | 2 | 8 | | 2 | | | 1 | | | 2 | | |
| MacThwaite Oil & Gas Co., Ada, Okla. | 2 | 5 | 12 | | | 1 | | | 1 | | | |
| Oklahoma Natural Gas Corp., Tulsa, Okla. | 85 | | | 11 | 56 | | 2 | | | 415 | 472 | |
| Oklahoma Utilities Co., Bristow, Okla. | | | | | | | | | | 55 | | |
| Southwestern Light & Power Co., Oklahoma City, Okla. | 8 | 9 | | 2 | | | | | | 1 | 16 | |
| Natural Gas Corp. of Oregon | 2 | | 150 | | | 20 | | | 12 | | | |
| Portland Gas & Coke Co., Portland, Ore. | 469 | 327 | 400 | 3 | 1 | 1 | 1 | 2 | 1 | 178 | 190 | 190 |
| Southern Oregon Gas Corp., Medford, Ore. | 9 | | | | | | | | | | | |
| Northwestern Public Service Co., Huron, S. Dak. | | | | | | | | | | 12 | 5 | 15 |
| Sabine Utilities Corp., Port Arthur, Texas | 35 | 70 | | | | | | | | | | |
| San Antonio Public Service Co., San Antonio, Texas | 27 | | 50 | | 1 | | | | | 30 | 3 | 50 |
| Texas Public Service Co., Austin, Texas | 8 | | 50 | 1 | | 23 | | | | | | |
| West Texas Gas Co., Lubbock, Texas | 9 | 11 | | 1 | 1 | | 3 | 1 | | | | |
| United Gas Public Service Co. Huston, Texas | | | 16 | | | 7 | | | | | | |
| Ogden Gas Co., Ogden, Utah | 23 | | | | 1 | | | | | | | |
| Utah Gas & Coke Co., Salt Lake City, Utah | 35 | | | | | | | | | | | |
| Natural Gas Corp. of Washington | | | 75 | | | 10 | | | 5 | | | |
| Northwest Cities Gas Co., Walla Walla, Wash. | 24 | 14 | 50 | | 6 | 5 | 1 | | 5 | 30 | 61 | |
| Puget Sound Power & Light Co., Seattle, Wash. | 4 | 2 | 10 | 1 | | 2 | | | 2 | 1 | | 4 |
| Seattle Gas Co., Seattle, Wash. | 350 | | 600 | | | | | | | 100 | | 150 |
| Spokane Gas & Fuel Co., Spokane, Wash. | 41 | 36 | 100 | 5 | 2 | 25 | 2 | 1 | 20 | | | |
| Washington Gas & Electric Co., Tacoma, Wash. | 53 | | | 2 | | | | | | 1 | | |
| New York Oil Co., Casper, Wyo. | 7 | | | | | | | | | 2 | | |

# Appliance Sales Review—1930-1931

*(Continued from Page 24)*

hundreds; one utility has budgeted to sell as high as 1,000 refrigerator units in 1931.

In many cases sales figures are provided for 1930 without corresponding figures for 1929, indicating that sales work was begun last year on the appliance in question. An increasing number of companies are now considering the refrigeration, incineration and laundry loads as integral elements of their sales market.

## Northwestern Natural Gas Corp. Moves Headquarters to Seattle

Northwestern Natural Gas Corp. announces the removal of its headquarters to the Northern Life Tower, Seattle, Wash. The company has also moved a part of the Wichita, Kan., office to Seattle, and the operations of the Northwestern Natural Gas Co. of Kansas, the Northwestern Oil & Gas Co. of Washington, and the Northwestern Natural Gas Corp. will be carried on from Seattle.

The companies have completed four gas wells in Benton County field recently, bringing the total in that field to 14 gas wells. Northwestern Natural Gas Corp. has been supplying gas from this area to Sunnyside, Grandview, Mabton and Prosser since 1929. Additional extension is planned for Pasco and Kennewick some time this fall, and in addition the company has secured franchises in Walla Walla, Toppenish, Wapato, Zillah and Granger, Wash.

## H. P. Mueller Takes Father's Post as President, L. J. Mueller Furnace Co.

At a meeting of the board of directors of the L. J. Mueller Furnace Co., held on May 19, the following officers were elected: P. E. Mueller, chairman of the board; H. P. Mueller, president and general manager; G. C. Mueller, vice-president, and Joseph Schlueter, secretary and treasurer.

*H. P. Mueller*

H. P. Mueller, president-elect, succeeds his father, the late L. J. Mueller, Jr., whose death occurred in May.

In assuming his new duties, Mr. Mueller brings a background of splendid experience. Following completion of his education and a period of service with the American forces in France, he served successively in the principal departments of the Mueller organization, covering both engineering and sales experience. After filling positions as territorial salesman, office salesman and director of sales, he was elected vice-president in 1925, and, with this recent appointment, becomes president of the company.

Mr. Mueller has been interested for many years in activities in the warm air heating field, and is at the present time a member of the board of directors of the National Warm Air Heating Association.

## McNair to Head Canadian Gas Assn. for Coming Year

Hugh McNair, manager of the Winnipeg Electric Co., Winnipeg, Manitoba, was chosen to head the Canadian Gas Association for 1931-1932, at the Association's 24th Annual Convention, held June 4 and 5 at Montreal, Quebec. F. S. Williams, superintendent of the Board of Light & Heat Commission, Guelph, Ontario, was elected first vice-president, and J. C. Dawson, of Quebec, Province of Quebec, was named second vice-president. G. W. Allen of Toronto, Ontario, will continue in his post as secretary-treasurer.

The convention meetings were held under the direction of A. T. Leavitt, general manager of United Fuel Investments, Ltd., Hamilton, Ontario, president of the Association, and featured many interesting papers and addresses.

## Progress Reported on So. Fuel's Line from Kettleman Hills

Just as *Western Gas* goes to press, report comes from Southern Fuel Co., constructing a 210-mile, 26-inch line from Kettleman Hills to Long Beach and Los Angeles, that the portion of the line being constructed by Lindgren & Swinerton, Inc., from Long Beach to Glendale, a distance of 27 miles, is complete. Part of this section was of 28-inch pipe. Section 2, 31 miles long, extending from San Fernando to Castaic, is well under way, under the direction of Macco Construction Co. and Robertson Construction Co. Section 3, from Castaic to Grapevine, a distance of approximately 45 miles, has been begun by the Southern California Construction Co., and the fourth section, 108 miles, also being constructed by the Macco and Robertson companies, is expected to get under way early in July.

## Change in Operating Set-Up for Oklahoma Natural

AN important change in the form of organization of the offices and personnel of the Oklahoma Natural Gas Corp., headquartered at Tulsa, was announced recently by E. A. Olsen, executive vice-president.

Under the new organization plan the Oklahoma Natural territory will be divided into 13 major districts with a district manager in charge of each, who will be responsible to the central management.

*Ardmore* (includes Healdton, Ringling, Wilson): F. W. Bortle, district manager; J. Gillis, district superintendent.

*Broken Arrow:* C. E. Cantrell, district manager; J. E. Mineo, district superintendent.

*Chandler* (includes Arcadia, Davenport, Luther, Meeker, Stroud, Wellston, Prague): W. W. Bruce, district manager; H. S. Clark, chief clerk.

*Claremore* (includes Inola, Ramona): J. A. Breeden, district manager; J. E. Mineo, district superintendent.

*Enid* (includes Deer Creek, Hunter, Nardin, Pond Creek, Peckham, Lamont): C. R. Shiers, district manager.

*Haskell* (includes Bixby, Coweta, Porter): R. B. Caskey, district manager; R. Eidson, district superintendent.

*Muskogee:* W. M. Baker, district manager; R. Eidson, district superintendent.

*Oklahoma City* (includes Norman with Fay Kee, local manager, Edmond with W. A. Mineo, local manager, El Reno with J. W. Lockridge, local manager, Bethany, Britton, Yukon): W. P. Canavan, vice-president; M. L. Kapp, district manager; P. V. Root, assistant district manager; T. A. Wood, district superintendent; C. E. Sherburne, assistant district superintendent.

*Okmulgee* (includes Checotah, Eufaula, Morris, Warner, Weleetka): W. M. Maher, district manager; R. Eidson, district superintendent.

*Sapulpa* (includes Depew, Kellyville, Shamrock): C. C. Master, district manager; J. E. Mineo, district superintendent.

*Shawnee:* F. E. Padden, district manager; F. M. Orelup, district superintendent.

*Tulsa* (includes Dawson, Garden City, Turley): W. H. Bagley, district manager; J. A. Ray, assistant district manager; J. E. Mineo, district superintendent.

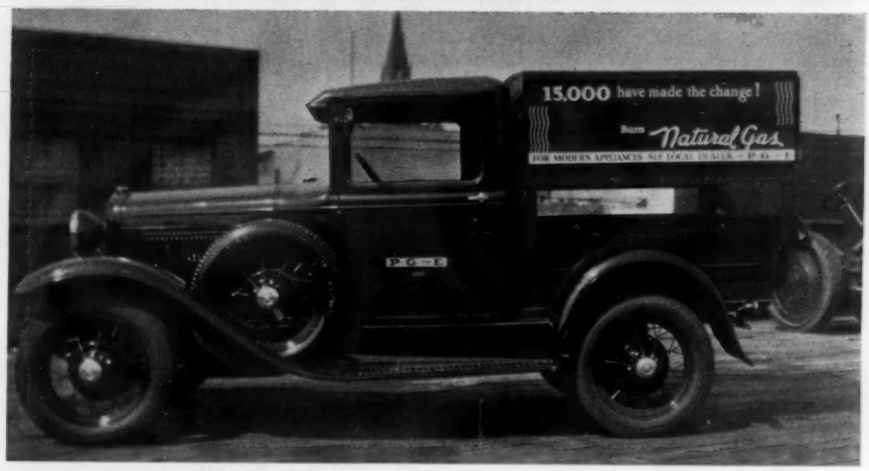
*Kansas:* C. M. Van Slyke, district manager; John Bass, district superintendent.

## Lone Star Pays $178,000 Interest on Security Deposits

More than $178,000 interest on security deposits was paid to gas customers in northern Texas and southern Oklahoma during the first few months of this year by gas companies affiliated with the Lone Star Gas Co., including the Dallas and Fort Worth gas companies. A part of this sum was paid in checks, and the remainder was deducted from the monthly gas bill.

## Offer $5 Bonus to Employees Giving Hot Tips on Prospects

As a method of increasing automatic refrigerator sales during the coming months, each employee of the San Antonio Public Service Co., San Antonio, Texas, is being given $5 for each prospect he turns in who is sold an Electrolux refrigerator. The offer began on May 15, and is effective until further notice.




*ABOVE: Type of billboard used by Pacific Gas and Electric Co. in the 44 towns of its system. BELOW: The same advertising copy is used on 300 service cars and trucks in the company's territory.*

## P. G. and E. Puts Billboard Copy to Many Uses

USING billboards for envelope stuffers is the latest advertising tie-in scheme to be promulgated by J. Charles Jordan, assistant advertising manager of the Pacific Gas and Electric Co., San Francisco.

The billboards, which are in use in 44 towns where 231 panels are being shown, are telling the story of natural gas and P. G. and E. service. On 300 trucks and service cars the same message in the identical form as is used on the billboards has been reduced in size to fit the panels provided for the purpose on the truck bodies.

Then a still further reduction is effected and 300,000 miniature replicas of the billboard message appear on monthly statements in the form of stickers. The stickers are one ten-thousandth of the size of the billboard posters. All copy is changed once every month.

## Combustion Space Requirements to Be Studied

F. J. RUTLEDGE, Chairman of the Committee on Industrial Gas Research, American Gas Association, announces that the executive board has approved the undertaking of a new industrial gas research project. This research is in "Fundamentals of Combustion Space Requirements in Industrial Gas Furnaces." The project is one of a series pertaining to high temperature combustion fundamentals, the entire series being carried on at the American Gas Association Testing Laboratory in Cleveland.

Mr. Rutledge pointed out that investigations by the committee, prior to beginning the project, showed that there is a lack of uniformity in the sizes of combustion chambers of standard industrial gas furnaces designed for the same temperature and production capacity. This variation is especially noticeable in the design of special furnaces. While expediency accounts for some of this lack of uniformity, the investigations showed that the greatest differences were due to the fact that the fundamentals of combustion space requirements have never been authoritatively determined.

Active work at the Cleveland Laboratory in connection with this research is now getting under way. This is the 20th research propect undertaken by the Committee on Industrial Gas Research.

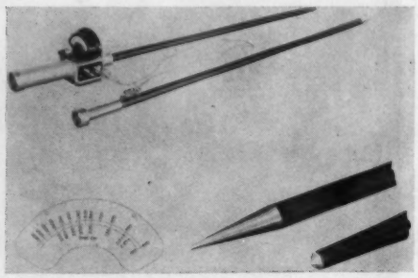
# Device for Measuring Soil Corrosiveness

AS a result of the study of corrosion on underground pipes, which the Bureau of Standards has been carrying on for a number of years, a new instrument has been developed for measuring the electrical resistivity of soil in place without the necessity of removing the samples to the laboratory for examination. The Bureau has found that soils high in soluble salts, and therefore low in electrical resistivity, are usually highly corrosive to pipe lines. Such low resistance soils are frequently found as naturally occurring outcrops or pockets in areas of otherwise normal or high resistivity. The predetermination of such areas is a matter of great importance to pipe line companies and utility operators, making it possible to provide suitable protection in exceptionally corrosive soils.

The present tendency in the protection of pipes against soil corrosion is away from a uniform coating for the entire length of the line and toward the application of coatings selected with respect to the corrosive character of the soils involved. This calls for a knowledge of varying soil conditions and a means of locating local corrosive soil areas. Such areas, commonly termed "hot spots," are prevalent in many types of soil, and it is in these regions that pipe lines suffer the greatest deterioration.

Although the Bureau of Standards has found no direct relation to exist between the electrical resistivity of soils and their corrosive properties, abrupt changes in resistivity and unusually low resistivity are found to be significant with respect to corrosion. Soils having a resistivity of about 500 ohm-centimeters or less are found to be highly corrosive. A better relation between resistivity and corrosiveness exists in alkali than in acid soils.

The Shepard earth resistivity meter shown in the illustration consists of two rods or canes tipped with iron electrodes. A flashlight battery and milli-ammeter are mounted in a light aluminum frame on one of the rods. The rods are pushed into the earth with a separation of about one foot or more, at the bottom of a pair of auger holes, a shallow excavation, or the side of an open trench. The circuit is then closed and the resistivity of the soil is read directly in ohm-centimeters on the scale of the instrument.



A feature of the apparatus which is unique is the manner in which polarization has been overcome or minimized and by which an accuracy closely approaching a.c. bridge determinations has been attained. This has been accomplished by making the cathode or negative electrode much larger than the anode or positive electrode, as shown in the accompanying figure. Polarization, which is largely a cathode effect and is also a function of current density, is greatly reduced by employing electrodes differing greatly in areas.

Two scales are provided on the meter, one ranging from 400 Ohm-cm. upward and the other from 100 to 500 ohm-cm. Provision is also made for checking the voltage of the three-volt flashlight battery carried in the aluminum hand grip. The device was developed by E. R. Shepard of the Bureau of Standards.

# Gas Dispatching on P. G. and E. System

*(Continued from Page 31)*

and red as being shut. Detail atlas sheets of the system have also been furnished. A switchboard provides means of talking to all points on either private line and also to other rooms in the general office building and to the gas and electric plants.

This office maintains a log book in which are recorded each hour the pressures at San Francisco, Oakland, Milpitas, Tracy and Kettleman and also the hourly volumes of gas delivered from or received into the lines. Records are kept of the volumes of gas in the holders in the cities and also the amounts of gas being used by the steam electric generating plants of the company. It is also very necessary to keep in touch with the electric load dispatcher's office, especially during times of storm, in order to know as far as possible in advance when the gas will or will not be required at the steam electric plants. An excess or shortage of hydro-electric power available greatly affects the demand for gas.

The gas requirements must be estimated as closely as possible several hours in advance taking into consideration, in addition to the electric load, the weather, the day of the week, holidays, etc. United States Weather Bureau Reports are received and noted as soon as available. The gas control office advises the field office the amount to put in hourly and the effect of any increase or decrease in the volume put in the line at the field end is not felt until at least five hours at the Milpitas and Tracy terminals. Considerable regulating of the volume is also done at the Milpitas and Tracy terminals in order to hold a constant pressure at San Francisco and Oakland; since these terminals are near the big cities any changes there are felt quickly. The lines back of those points are used more or less as storage reservoirs except in times of great demand when no regulating is done and they are wide open. The hourly volumes are calculated and recorded at those terminals, a log book similar to the one in the gas control office being kept at each place.

The Kettleman operators, when they receive orders to change the volume going into the line, in turn communicate with the gasoline plant operators, or gas well operators (when the wells are in use) so that they will put the proper amount of gas into the field system. An attempt is made at all times to keep sufficient gas entering the pipe lines, at the same time avoiding building up excessive pressures on the system.

During times of breaks or leaks on the pipe line the gas dispatcher and head field operator or their operators can keep in communication with the men working on the line so that they know when the line will be back in service again or what progress is being made with the work. Under such conditions the supply to one line must be curtailed or shut off and if it is to be off for some time the gas dispatcher must issue orders to the large company plants to discontinue using gas temporarily, in order to conserve the supply for the company's domestic and industrial consumers. Under such conditions it is readily seen that a communication system is invaluable. Two regular telephone line men are employed, being furnished with the necessary auto equipment and tools in order to maintain the telephone system.

In addition to dispatching the gas the chief gas dispatcher working with the head field operator, keeps daily records of the gas received from each company from whom gas is purchased and the amounts of gas delivered from the system, so that each day the loss on the system, if any, is known.

In addition to taking the corerct amounts of gas to supply the demand, the gas must be properly pro-rated among the companies from whom it is bought so as to fulfill all contract obligations, which further complicates the operating.

The field figures are furnished the gas control office by the head field operator and the chief dispatcher makes up the monthly reports of gas received from the oil companies and delivered to other divisions of the Pacific Gas and Electric Co. or other utilities for whom the gas is being transported.

---

## Public Service Corp. of Nebraska to Recondition Oil Line

Recent reports state that the Public Service Corp. of Nebraska has leased 400 miles of the old Teapot Dome oil line and will recondition it for natural gas service. Franchises have already been secured by the company through its representative, Thos. Cook of Amarillo, Texas, in the following Nebraska cities and towns: Sutherland, Norton, Indianola, Hershey, Bartley, Brady and Arapahoe, and applications are pending in several others.

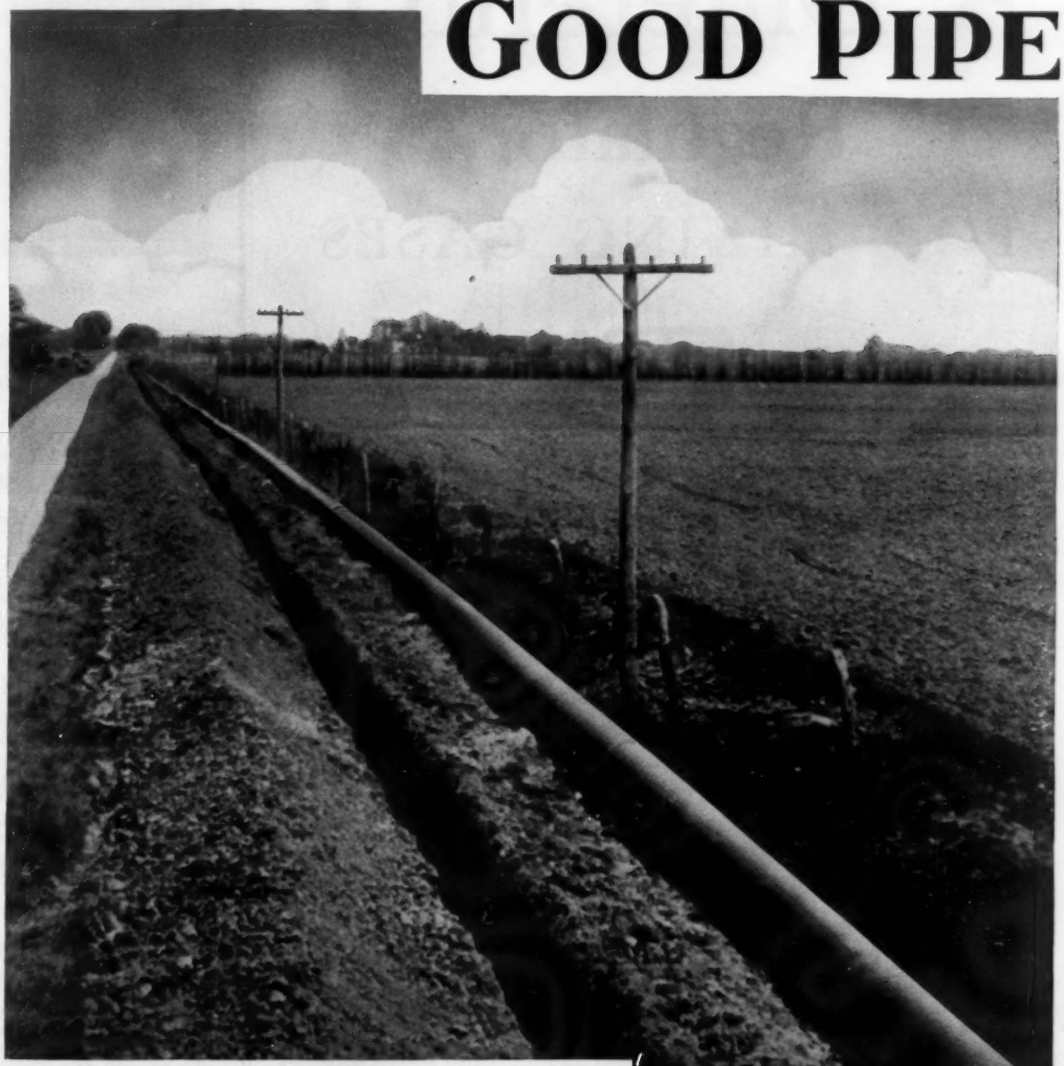
## "Western Gas" Is Indexed by Engineering Index Service

*Western Gas* is regularly indexed by the Engineering Index Service, a division of the American Society of Mechanical Engineers. This service is a comprehensive annotated index of current engineering literature of the world taken from approximately 1,800 engineering, scientific, technical and trade publications.

## Bowling Green, Mo. Now On Natural Gas Service

Natural gas was turned into the mains at Bowling Green, Mo., late in May, supply coming from the Panhandle Eastern Pipe Line Co.'s carrier from Texas to points in Illinois and Indiana. The gas is being served by the Bowling Green Gas Co., of which C. Rodes Hood is president.

# The First Requisite . . . . . GOOD PIPE



# For Reliable Service

Continuous and unvarying service to patrons is the essence of what a gas company sells. An uncertain or irregular service would be a service of limited value.

Because they appreciate this fully, and because they realize that durable, sound pipe is the first requisite for reliable service, many leading gas companies in all parts of the United States have made NATIONAL their standard.

Strength adequate for high pressures, unusual ductility, and excellent working quality in all respects, are among the merits that commend NATIONAL Pipe to informed users and are factors that have made it—

***America's Standard Wrought Pipe***

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

Subsidiary of United States Steel Corporation

# NATIONAL PIPE

# A Differential Regulator FOR MIXING GASES

CF

In the conservation of our natural gas by mixing with coke-oven gas this regulator is destined to have a place of importance

*Get The Details*

## The Chaplin-Fulton Mfg. Co.

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes From 1 Inch to 24 Inches; For All Service. 1 oz. up to 2,000 lbs. Pressure to Square Inch.

28-40 Penn Avenue Pittsburgh, Pa.

REPRESENTATIVES:

WESTCOTT & GREIS, Inc.
Sales and Service
Dallas — Los Angeles — Tulsa

JNO. W. CRAWFORD
Sales Engineer
1855 Industrial Street Los Angeles

PARSONS ENGINEERING CO.
Los Angeles, Calif. San Francisco, Calif.

Or Any Jobber

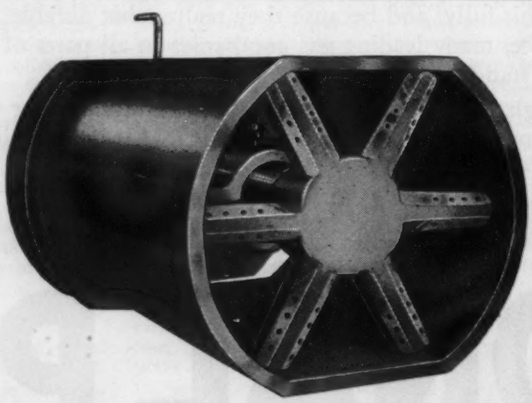


GAS BURNERS
For
ALL INDUSTRIAL PURPOSES

JOHN ZINK CO.
Oklahoma Natural Gas Bldg.
Phone 4-9838
TULSA, OKLAHOMA

★

Flameless Burners
Flame Burners
Short Flame Burners




## F. E. Stevens, President of Lattimer-Stevens Co., Dies

*Frank E. Stevens*

FRANK E. STEVENS, president and founder of the Lattimer-Stevens Co., pioneer gas appliance manufacturing firm, died suddenly on June 13, following an acute heart attack.

Mr. Stevens was 69 years of age, and had been identified with the gas industry for practically his entire life. He was a familiar figure at all gatherings of the American Gas Association and the Pacific Coast Gas Association, and will be mourned deeply by a host of friends in the industry.

## Industrial Installations by B. C. Electric Railway Co.

A gas-fired smokehouse is now being served in Vancouver, B. C., by the gas department of the B. C. Electric Railway Co. Gas is used exclusively for boiling meat, rendering lard, and in the smokehouse itself for the smoking of hams, bacon, weiners and other lines.

Another industrial gas installation was completed recently by the company at the Cascade Plating Works, Pender Street, where a 2-h.p. gas-fired steam boiler for chromium plating was installed. A similar boiler was also supplied to the James Martin Co. for processing syrup. Another interesting installation at Vancouver was a steam generator for processing dried fruit. The equipment for this generator was entirely made in the sheet metal shop of the B. C. Electric gas department.

## John Allen Leaves Minot to Become Manager at Merrill, Wis.

John Allen, manager of the Minot Gas Co. for the past year, has been transferred to Merrill, Wis., where he became manager of the Merrill Gas Co., subsidiary of the Continental Public Utilities Corp., Minneapolis, Minn.

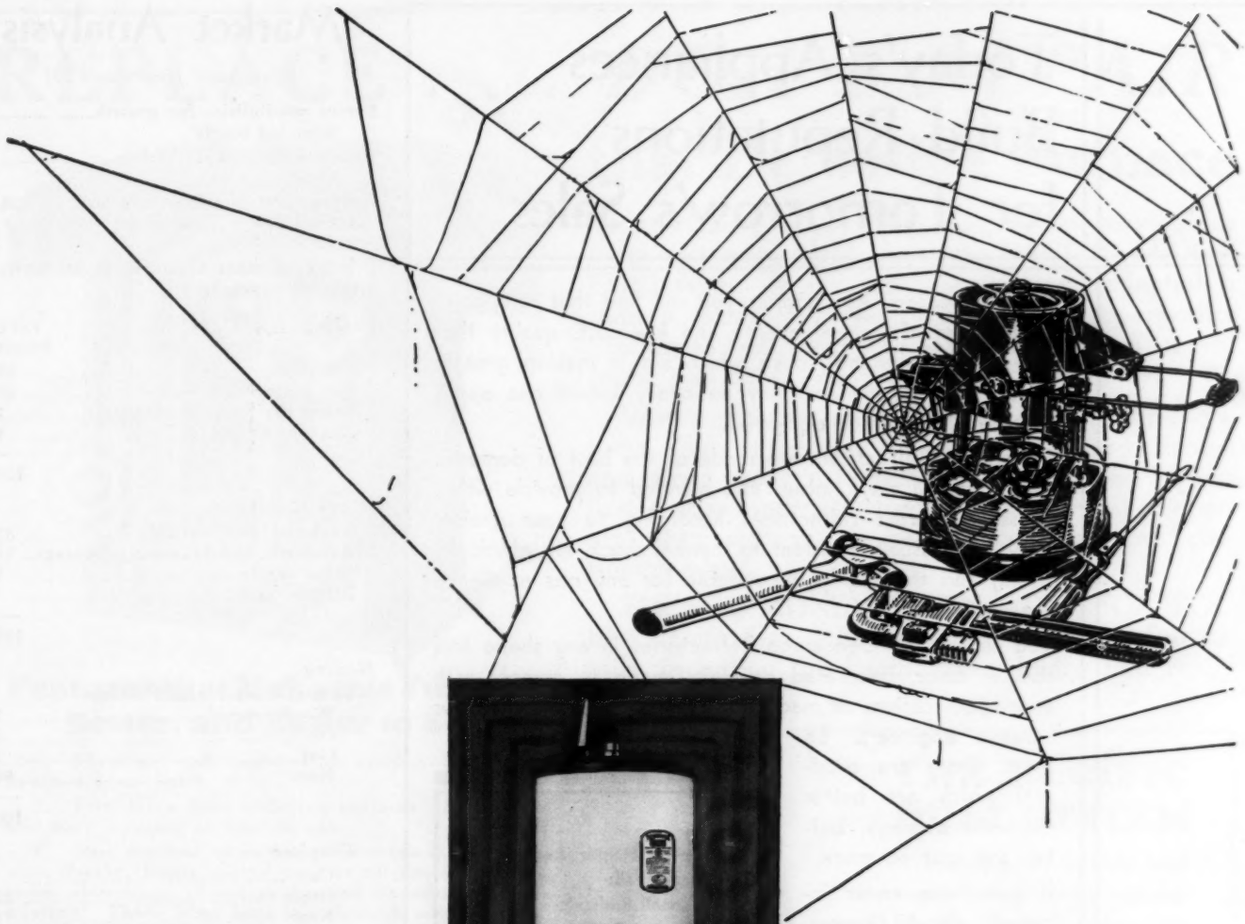
Continental Public Utilities' interest in the Minot Gas Co., was recentlv purchased by the Montana-Dakota Power Co.

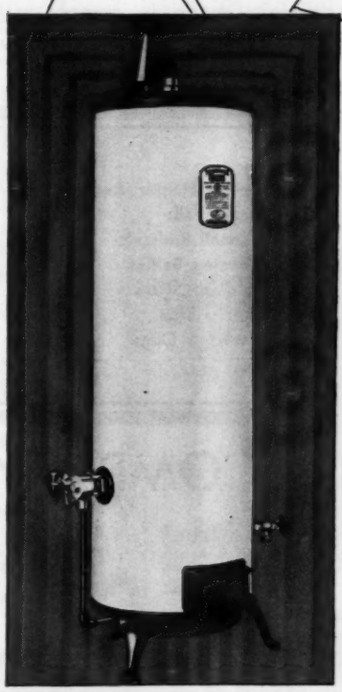
## Moody-Seagraves Reported to Be Interested in Northwest Field

According to statements in the Northwest press, Moody-Seagraves Co. of New York has leased 40,000 acres of Willamette Valley, Oregon, land, and plans to begin a gas development program sometime early in 1932. It is reported that the company has been working in the area for several months with field and geological crews headed by Dorsey Hager and J. F. Powell.

## Coast Counties to Establish Maintenance Center at Concord

Coast Counties Gas & Electric Co., headquartered at Santa Cruz, Calif., plans to establish a maintenance center at Concord, Calif., where the company will construct a warehouse on a site recently purchased.





# *Upkeep*

**The real measure of a water heater's success is found on the gas company's books under the head of "Cost of Servicing." The Welsbach Hotzone has established a record of low upkeep over a wide area of the country. Its success is two-fold—in homes and in the "net profit" columns of numerous gas companies.**

**Welsbach**
**HOTZONE**
SELF ACTION GAS WATER HEATER

MEMBER AMERICAN GAS ASSOCIATION

**The simplicity and the rugged construction of the Welsbach Hotzone Water Heater are the two main reasons for its freedom from service calls. The Hotzone is built to endure — and it does it without the need of repairs and tinkering. The Hotzone leads the field in the campaign of "save the profits."**

***For More Information, Write***

**WELSBACH COMPANY, GLOUCESTER CITY, N. J.**

**50 Hawthorne Street, San Francisco, Calif.** **226 S. Wabash Avenue, Chicago, Ill.**

# Today's Appliances Build Reputations for Tomorrow's Sales

IN Genceraco Refractories you will find that rare combination of unusual quality and low cost, quality that wins warm friends, costs which aid in making greater sales. That is why so many nationally known gas appliances are Genceraco equipped.

Genceraco Refractories are made of the best of domestic and imported clays, mixed and blended to provide either dense or porous refractories according to your choice. They are unusually resistant to thermal shock, are physically strong and thoroughly dependable for any gas appliance service.

You can obtain Genceraco Refractories in any shape and size, in color, decorated or plain, made to comply with your specifications or made of materials developed by our ceramic engineers. In short, these are products which are better than the average, better, yet cost no more.

If you have never inquired about **Genceraco** Refractories why not inquire today? See for yourself how these custom-made pieces meet every need.

Space Heater Radiants
Back Walls
Tunnell Radiants
Leaning Baffles
Radiant Sticks
Burner Tips
Skeleton Cups

GENERAL CERAMICS COMPANY

71 West 35th Street
NEW YORK, N. Y.

REFRACTORIES, the heart of gas appliance performance



# NEMEC COMBUSTION EQUIPMENT For All Firing Requirements

NEMEC COMBUSTION ENGINEERS
WHITTIER - - - CALIFORNIA


# Market Analysis

*(Continued from Page 20)*

Future possibilities for growth..... Slow but steady

Principal competitive fuel ..... Coal

Average cost of competitive fuel vs. gas..... *Coal* $16.00; *gas* $1.28 (cooking), $.80 (heating).

Index of market saturation as shown by appliance surveys:

| *Cooking* | Per cent Saturation |
|---|---|
| Gas ranges | 69.7 |
| Hot plates and cookers | 27.7 |
| Wood coal and oil ranges | 1.0 |
| Electric ranges | 1.6 |
| | 100.0 |

| *Water Heating* | |
|---|---|
| Tanks or combination | 82.0 |
| Automatic, instantaneous or storage | 11.7 |
| Other fuel | 5.9 |
| Electric | .4 |
| | 100.0 |

| *Heating* | |
|---|---|
| Central Furnaces and Boilers | |
| Wood or coal | 5.5 |
| Oil | 0.3 |
| Gas | 1.2 |
| None | 94.0 |
| | 100.0 |
| Fireplace | |
| Gas | .8 |
| Other fuel | 21.5 |
| None | 78.7 |
| | 100.0 |
| Individual Room Heaters | |
| Gas | 7.7 |
| Other fuel | 63.8 |
| None | 28.5 |
| | 100.0 |

CASE 2

Type of town ..... Suburban; residential

Number of consumers ..... 3,445

Average class of consumers ..... Businessmen

Employment situation ..... Good

Economic conditions ..... Good

Average income per family ..... $5,000

Future possibilities for growth..... Good; fairly rapid

Principal competitive fuel ..... Coal

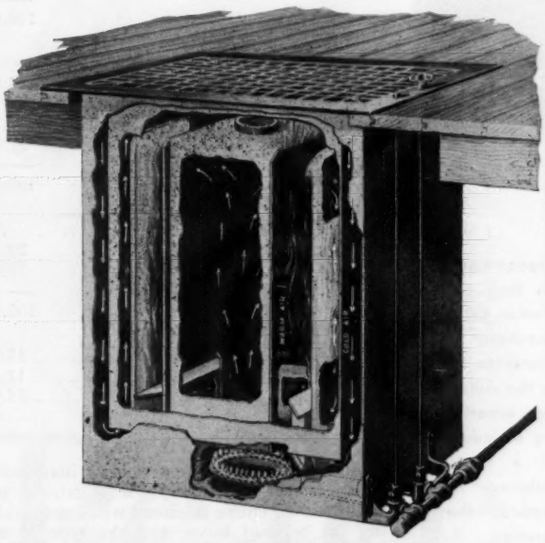
Average cost of competitive fuel vs. gas..... *Coal,* $17.50; *Gas,* (cooking) $1.10; (heating) $.75

Index of market saturation as shown by appliance survey:

| *Cooking* | Per cent Saturation |
|---|---|
| Ranges | 71.7 |
| Hot plates and cookers | 12.0 |
| Wood and coal | 14.8 |
| Electric | 1.5 |
| | 100.0 |

# REPLACE . . . *DON'T REPAIR*

## that Defective Furnace



There's more money for you, better service for your customer, in a brand new PACIFIC FLOOR FURNACE. It will take no longer to install it than it would to repair an old furnace or other heating system, and you have paid yourself a real profit and done your customer a real favor.

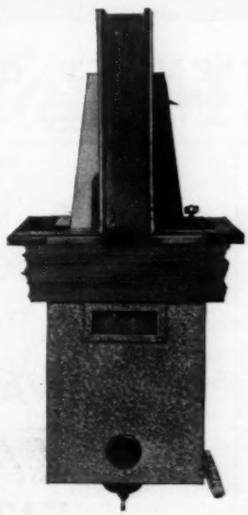
Winter weather shows up defective heating systems. Now is the time to sell Pacific Floor Furnaces and other modern Pacific Gas Appliances. Their first cost is moderate; they are economical to operate; they deliver the heating comfort your customers want.

THERE'S MONEY, RIGHT NOW, FOR YOU in a Pacific Gas Agency. Write today for full details, including the Pacific Sales Helps that really sell.

### Features that Make this Furnace Better, and Easier to Sell

1. Floor or wall registers in antique bronze or brushed brass finish.
2. Five large heat radiating surfaces (four sides and top) utilizing all heat in gas.
3. New method of casing construction, exclusive with Pacific, keeps casing cool at all times, and insures abundance of air to heating chamber for reheating. **There is no heat loss through outer casing.**
4. Heating unit of 20-gauge pure ingot iron. Pressed and Welded joints are absolute insurance against leakage. Extra heavy cast iron dome superheats air before it passes into room.
5. Raised-tip Bunsen type burners, with clean-drilled flame holes and soapstone tips. Long heat travel of burned gases and indirect method of venting allow hot gases to come in contact with greater radiating surface than possible in other designs.
6. Three sizes, to meet the needs of any type or size of building.
7. Adaptable to any type of modern electric or hand control.

***Our Agency Proposition is Attractive . . .***
***Write for Particulars on Your Locality***



### THE PACIFIC DUAL SYSTEM

Identical in quality and construction with regular Pacific Floor Furnace, but has two registers. Delivers heat into two rooms at once, or may be used in either room alone. Every Pacific Furnace is fully guaranteed in every detail of material and workmanship, with nearly 20 years of reliable dealing behind the guarantee.

# Pacific Gas Radiator Company

*Gas Heating* **Headquarters**

Roseberry and Walter Streets
Huntington Park California

Gas-Steam Radiators

Round Furnaces

Dual Pipeless Furnaces

Fireplace Radiant Heaters

Recess Radiant Wall Heaters

Automatic Storage Hot Water Heaters

Pipeless Floor Furnaces

Gas Radiators—Pressed Metal and Cast Iron

**Agencies Throughout the West**

**Call for a Pacific Heating Engineer**

MANUFACTURERS *of* EVERY TYPE *of* GAS HEATING APPLIANCE

THERE IS A CECO GAS BURNER
for HOME, BUSINESS BLDG., POWER PLANT, REFINERY and INDUSTRIAL PROCESSES

Gas companies who recommend CECO Gas Burners to their patrons are sure of customer satisfaction . . . for the purchaser of a Ceco has as his guarantee of satisfactory peformance the skilled service of combustion experts. Whether it's for heating or industrial use, you'll find a Ceco Burner especially designed to give the most economical, the most dependable operation. Illustrated Bulletins will be sent promptly on request.

COMBUSTION EQUIPMENT COMPANY
GENERAL OFFICE: KANSAS CITY, MO.
WICHITA MEMPHIS LITTLE ROCK HOUSTON

*Water Heating*

| | |
|---|---|
| Tanks and combination | 49.7 |
| Automatic, instantaneous & storage | 47.7 |
| Other fuel | 2.2 |
| Electric | .4 |
| | 100.0 |

*Heating*

Central Furnaces and Boilers

| | |
|---|---|
| Wood and coal | 28.6 |
| Oil | 5.9 |
| Gas | 11.7 |
| None | 53.8 |
| | 100.0 |

*Fireplace*

| | |
|---|---|
| Gas | .7 |
| Other fuel | 22.1 |
| None | 77.2 |
| | 100.0 |

*Individual Room Heaters*

| | |
|---|---|
| Gas | 13.3 |
| Other fuel | 11.0 |
| None | 75.7 |
| | 100.0 |

These two cases illustrate the inadvisability of attempting to lay out a general program for an entire territory without considering the type of town, and the type of consumer to whom sales will be made; as in the case of the first town, which is of an industrial type, the average class of consumers being mechanics and laborers and of very low average income per family, it could not be expected to sell high priced quality appliances in any volume due to the consumer's inability to pay. However, in the second case, which is that of a suburban town with a comparatively large average income per family, the sales effort could very readily be directed to quality appliances with the expectations of good results.

Another factor which must be taken into consideration, particularly in heating, is whether or not the residences have basements. In other words, if the majority of the homes do not have facilities for the installation of central heating equipment, then the sales effort must of necessity be directed either to floor furnaces or individual room heaters.

## Des Moines to Get "Natural" by September 1; Line Under Way

Construction of a 16-inch line to serve Des Moines, Iowa, through Des Moines Gas Co., was expected to begin July 1 with service scheduled to start in that city by September 1. The line is being laid from Missouri Valley Pipe Line Co.'s main line at a point near Ogden.

A new schedule of rates based on the change to natural gas will be submitted to the city council on the arrival of the new fuel by C. A. Leland, Jr., vice-president and general manager of the Des Moines Gas Co.

It is reported that a mixed gas of about 700 B.t.u. will be supplied to the city, replacing manufactured gas of 530 B.t.u.

## Paul Lime Quarries on Natural; to Manufacture "Dry Ice"

The Paul Lime Quarries, west of Douglas, Ariz., plan to manufacture dry ice as a by-product of quarry operations. The Paul quarries are reported to be the third in the United States to employ natural gas as a fuel. The company is now being connected up to the newly completed 12-inch line of the Western Gas Co., El Paso, Texas.

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

Specify WALWORTH VALVES FITTINGS AND TOOLS for GAS

WALWORTH
General Sales Office
60 E. 42nd St., New York

WALWORTH CALIFORNIA CO.
235 Second St., San Francisco

WALWORTH COMPANY
809 Fourth Place, Los Angeles

*The Time-O-Stat No. 808 Snap Acting Storage Water Heater Thermostat is extra large in capacity—74 feet at ½-inch drop. It has a leather valve disc that will not leak. Its adjustment is tamper-proof, yet it is readily accessible. Threads are provided for a ⅜-inch union nut.*

# Peace of mind *for Mrs. Smith*

# PROFITS *for your Appliance Department*

***this storage water heater thermostat prevents overheating in periods of infrequent demand***

Just because Mrs. Smith goes away for the day —there's no need for the hot water to get too hot. Or for her to shut off the heater entirely.

The water temperature will stay right where it belongs, *automatically*, if you sell her a Minneapolis-Honeywell No. 808 Snap Acting Thermostat.

Instead of keeping a low continuous flame throughout periods of no demand, the No. 808 shuts the gas clear off whenever the temperature starts to climb—and back on again, of course, when the water begins to get too cool.

The No. 808 not only removes the danger of overheating, but it helps home and apartment owners make more efficient use of their gas. Every home with gas is a prospect for a burner equipped with the No. 808 Snap Acting Thermostat.

This Thermostat is a member of a complete line of automatic control equipment, designed to aid you in building up old markets and finding new. Let us send you a catalog containing complete description of the No. 808 and other gas controls.

*Minneapolis-Honeywell Regulator Company*

CALIFORNIA BRANCH
557 Market Street, San Francisco, California

DISTRIBUTORS
Portland, Seattle, Salt Lake City, Denver

DISTRIBUTORS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *North Coast* | Arthur F. Erickson Co.<br>315 Selling Bldg.<br>Portland, Oregon | *Southern California* | English & Lauer<br>1224 South Pedro St.<br>Los Angeles, Calif. | *Denver* | Daly Company<br>1635 Blake St.<br>Denver, Colo. | *Salt Lake City* | Hawley-Richardson-Williams Co.<br>204 Dooly Bldg.<br>Salt Lake City, Utah |

# MINNEAPOLIS-HONEYWELL

## *Automatic Heat Controls*

*The*
BARTLETT HAYWARD CO.
*Engineers and Founders*
BALTIMORE NEW YORK

DESIGNERS AND BUILDERS
OF
COMPLETE COAL GAS PLANTS

CARBURETTED WATER GAS PLANTS

BY-PRODUCT PLANTS

DE BROUWER CHARGING AND
DISCHARGING MACHINES

SALT WATER AND FRESH WATER
CONDENSERS

PURIFIERS

SHAVING SCRUBBERS

CENTRIFUGAL VERTICAL TYPE
SCRUBBERS

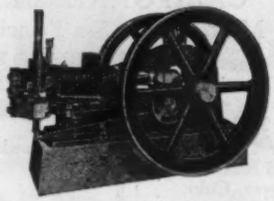
STEEL TANKS

VERTICAL WASTE HEAT BOILERS

GAS HOLDERS

**Increase Your Industrial Load With Natural Gas Engine Power.**

**USED FOR:**
**Ice Plants**
**Cotton Gins**
**Pumping Plants**
**Laundries**
**Brick Plants**
**Electric Generating**
**Manufacturing Plants**



**Gas engines save over Electric Motors Steam Engines Gasoline Engines and Oil Engines. Their savings are so great you will be surprised.**

*WRITE US FOR FULL INFORMATION ABOUT THESE SAVINGS*

CHARTER GAS ENGINE COMPANY - STERLING, ILLINOIS

**Manufacturers of Dependable Gas Engines Since 1880**

**Single Cylinder 25 to 100 h.p.** **Double Cylinder 60 to 200 h.p.**

*Wm. Taylor Hotel, one of the newer hotels of San Francisco—situated at San Francisco's Civic Center where Pacific Coast Gas Association convention activities will focus, August 31 to September 5.*

---

### Walker S. Clute Named District Engineer for U. S. G. S.

Walker S. Clute, formerly of Los Angeles, Calif., has been appointed to the post of district engineer for the U. S. Geological Survey with offices in the Wright Building, Tulsa, Okla. This district is a branch of the Mid-Continent Division of the Geological Survey headquartered at Muskogee, with John M. Alden as supervisor of oil and gas operations.

### J. Y. Wheeler Named Oklahoma State Mgr. for Community Natural

J. Y. Wheeler of Wynnewood, Okla., district manager, Community Natural Gas Co., has been promoted to the position of state manager for the company. He will retain his headquarters in Wynnewood. He has been succeeded as district manager by C. L. Slover of Texas, who will also reside in Wynnewood.

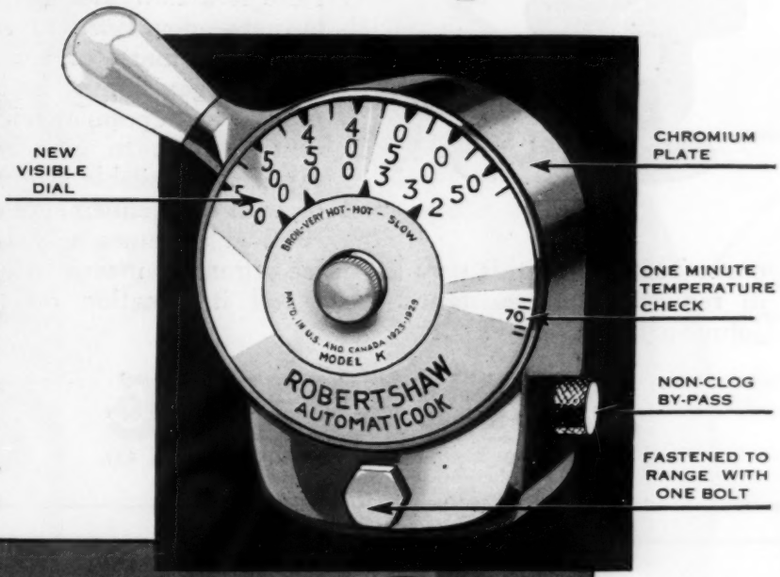
### Red Oak, Okla., Grants Permit to Spiro Gas Co.

Red Oak, Okla., has granted a natural gas franchise to the Spiro Gas Co., subsidiary of the LeFlore County Gas & Electric Co., Poteau, Okla. The company will construct 3 miles of gas line from the Yancey well north of the city, with service scheduled to begin within 60 days.

### Minnesota Northern Power Co. Changes Operating Set-Up

All operations of Minnesota Northern Power Co., subsidiaries in north central Montana will hereafter be conducted in the name of the Northwest States Utilities Co., replacing the name of the Montana Cities Gas Co. and the Northern Natural Gas Co.

# » Creating NEW customers for you




BY CONSISTENT ADVERTISING in the foremost national publications, American housewives all over the country have been educated to *insist* on having a gas range that is Robertshaw equipped. And that means a *new* range, for the Robertshaw cannot be sold separately. More than 140 popular brands are now made with the Robertshaw as standard equipment.

It's smart selling strategy for you to demonstrate the Robertshaw as often as you can. Show the housewife how this simple, trouble-proof, neat appearing device gives her automatic and controlled cooking. Make her realize what it means to get away from the kitchen for hours and hours of new freedom, new sociability.

Keep in touch with the great advertising drive. See the campaign this spring. Be sure that your salesmen and service men also know the manifest advantages of Robertshaw cooking. Just send us their names and we will place the Robertshaw story throughout your organization.

ROBERTSHAW
THERMOSTAT COMPANY
YOUNGWOOD, PENNA.

# ROBERTSHAW
## AutomatiCook

# Meet Johnson Jr.

## The Biggest Little Fellow in the Gas Home Heating Field

Here is a new idea in gas burners—developed to satisfy the demand of a new class of gas home heating prospects. A popular priced unit — built to give real service. Available stripped or with any refinements desired at an amazingly low cost. Think what this new low price argument means to you in reduced sales resistance. Get full information on the Johnson Junior today.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative—C. B. BABCOCK CO.
135 Bluxome St., San Francisco, Calif.

FRASER

Gas Furnaces and Heating Appliances

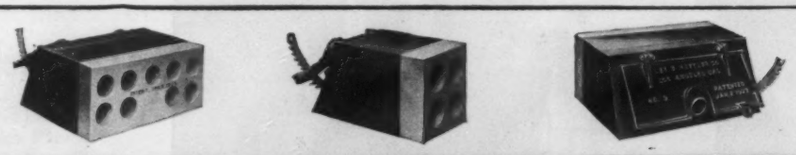
NEW MODELS—LOWER PRICES

5 sizes of Console Circulating Heaters
6 Floor and Wall Furnaces
8 Basement Units
Write for descriptive catalog and prices.

Manufactured by

FRASER FURNACE COMPANY, INC.
Stockton, Calif.

California Distributors: H. R. BASFORD CO. San Francisco Los Angeles



Mettler Entrained Combustion Gas Burners

FOR ALL Purposes
Kinds of gas
Pressures

406 S. Main St. LEE B. METTLER. CO. Los Angeles Cal.


### Fisher Governor Celebrating 50th Anniversary; Opens L.A. Branch

Fisher Governor Co., Inc., headquartered at Marshalltown, Iowa, has opened a new factory branch in Los Angeles, Calif. This factory will be under the immediate charge of Jasper H. Fisher, chairman of the board of directors of the company, and Ray McCoy, factory manager, who was formerly factory inspector at Marshalltown for the past 18 years. Forest Wehrman will be in charge of the office and accounting department. He has served with the Fisher Governor Co. in Marshalltown for the past four years. It is planned that the new factory will eventually carry a complete stock of Fisher specialties.

A brochure "Fifty Years of Leadership" was recently brought from the press in commemoration of the 50th anniversary of the company's founding, and gives a history of the organization from its inception in 1881 to the present day, when it has become nationally known. The brochure is artistically made up, with a gold foil cover and interesting illustrations, depicting the growth of the company.

### Annual Cooking School Held at Seattle, 3,000 Attend

The Second Annual Seattle Times Free Gas Cooking School, conducted by Miss Ella M. Lehr, cookery expert, and sponsored by Seattle Gas Co., was held in the Masonic Temple Auditorium, recently with approximately 3,000 women in attendance. Three of the leading furniture stores—Standard Furniture Co., Grunbaum Brothers, and Grote-Rankin, cooperated with the Seattle Gas Co. in making the school a success. Each day a range of different make was used in the demonstration kitchen on the platform and at the end of the school four modern gas ranges donated by the different companies were awarded to the four women giving the best written answers on "Five Reasons Why I Prefer to Use Gas."

### One Billion Cubic Feet of Gas Now Stored at Bow Island

Canadian Western Natural Gas, Light, Heat & Power Co., Ltd., reports the successful storage of more than 1 billion cubic feet of gas from the Turner Valley field in the depleted sands of Bow Island field since the beginning of the experiment.

The company is contemplating tripling the capacity of the repressuring plant at Bow Island with the object in view of storing 15,000,000,000 cubic feet of gas within the next 10 years.

### Lee Given Permission to Assign Franchise to Colorado Interstate

According to press report, Arthur K. Lee announces that the Colorado Springs city council has granted him permission to assign his contract and franchise for supplying the city of Colorado Springs with natural gas to the Colorado Interstate Pipe Line Co., which operates the Amarillo-Denver line. It is reported that Colorado Interstate will begin construction immediately on a 6-mile line to serve the town.

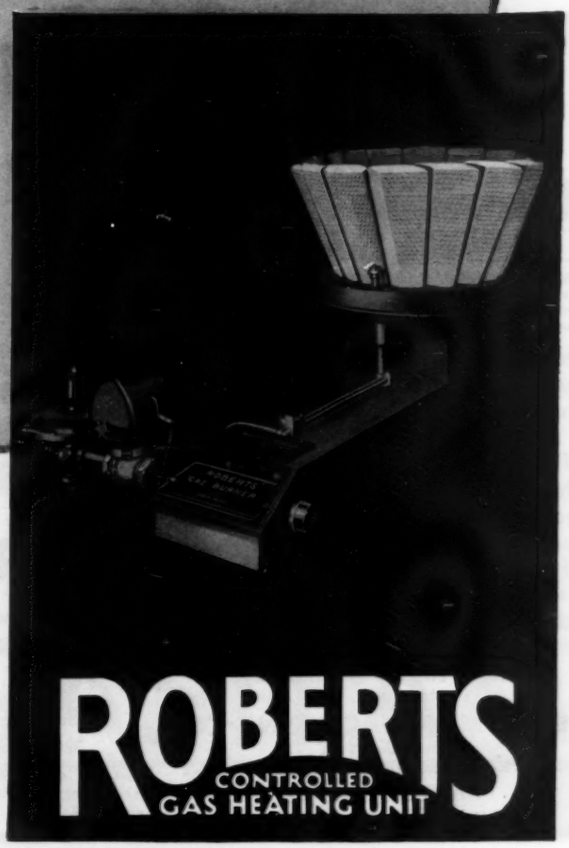
### More Montana Cities to Get Natural Gas, Is Report

Jones and Perkins, Montana gas operators, are reported to be considering construction of a gas transmission line for supplying "natural" to towns along the route of the Great Northern Railway west of Havre.

# 5 QUICK FACTS about the ROBERTS

1. Full air control.
2. Secondary air delivered to point of combustion.
3. Positive acting automatic pilot.
4. High air inspiration steel mixers.
5. Rugged, long life, china clay radiants.

*Send for new Roberts-Gordon book entitled, "Selling the Home Heating Market." Sent to any gas company executives entirely without obligation.*




ROBERTS-GORDON
APPLIANCE CORPORATION
CURTISS BLDG. BUFFALO, N. Y.

Trade Mark

Heat YOUR HOME with Gas

# Industrial Gas BOILERS

## Price Revision Downward on Tubular Boilers

The New H. E. Flueless Industrial Gas Boiler is now ready in four sizes.

One H.P. Two H.P. Three H.P. Four H.P.

"No Tubes But Equal Efficiency"

**P. M. LATTNER MANUFACTURING CO.**

Factory
516 12th Avenue
Cedar Rapids, Iowa

Warehouse Distributor
2646 South Hill Street
Los Angeles, California



COMBUSTION EQUIPMENT LEAHY LOS ANGELES, CAL. U.S.A.

# CONFIDENCE

EACH hour of factory operation is made up of sixty important minutes. The loss of a single minute means a sacrifice of production efficiency. Guarantee of continued operation therefore is a determining factor in the selection of equipment for the modern factory. The Leahy Dual Combustion Furnaces are selected by Heating Engineers because their installation is an assurance of boiler room efficiency and economy. Leahy Dual Combustion Furnaces burn either gas or oil. One fuel may be substituted for the other without loss of time or change in efficiency.

◆

**LEAHY MANUFACTURING CO**
Established 1902
1804-1812 East Eighth Street, Los Angeles, California
E. A. CORNELY INC.
1452 Bush Street, San Francisco, California

# MUELLER GAS ERA FURNACES

*Pressed of Steel*

offer the simplest, most economical stocking and installation set-up in the gas-heating industry. For details, write:

L. J. MUELLER FURNACE CO.,
334 S. 2nd St., Milwaukee, Wis.

*Makers of a complete line of gas-fired cast and pressed steel furnaces and steam and hot water boilers.*


## Northern Natural to Begin Using Republic Gas Corp. Gas on July 3

The 800-mile pipe line of the Northern Natural Gas Co. extending from Hugoton field, Southwest Kansas, will commence taking gas from Republic Gas Corp. July 3 for transportation to principal communities of eastern Nebraska and central Iowa, it was announced early in June. The Northern Natural Gas Co. is owned by the United Light & Power Co., North American Light & Power Co. and Lone Star Gas Corp.

The new line is designed for a capacity of 180,000,000 cubic feet a day and will represent an investment of approximately $30,000,000 upon completion.

A minimum of 60 per cent of the requirements of the Northern Natural Gas Co. will be supplied by Republic Gas Corp. from its reserves in the Hugoton field, comprising about 350,000 proven acres of gas holdings. These natural gas properties rank with the largest yet discovered and will serve as the source of gas supply for other large pipe lines.

## Plan Gas Fired Power Plant Near Turner Field

Utilization of Turner Valley waste gas which will mean development of tremendous electric power source in southern Alberta is anticipated if plans of the Hercules Consolidated Mining, Smelting and Power Corp. of London, England, are carried out. The project will involve investment of possibly $100,000,000, according to R. Crowe-Swords of Vancouver, B. C.

The Government of Alberta has given assurance to the above corporation that there will be no objection to their proceeding with the project.

Plans of the company include the construction of a large plant in proximity to the Turney Valley gas field for the purpose of generating electric energy.

## Now Altogether! One-Two-Three; One-Two-Three

A five-minute practice of light gymnastics morning and afternoon by the Lone Star gas Co.'s gas measurement department in Dallas, Texas, has solved the universal office problem of 10 o'clock restlessness and 3 o'clock fatigue for this group.

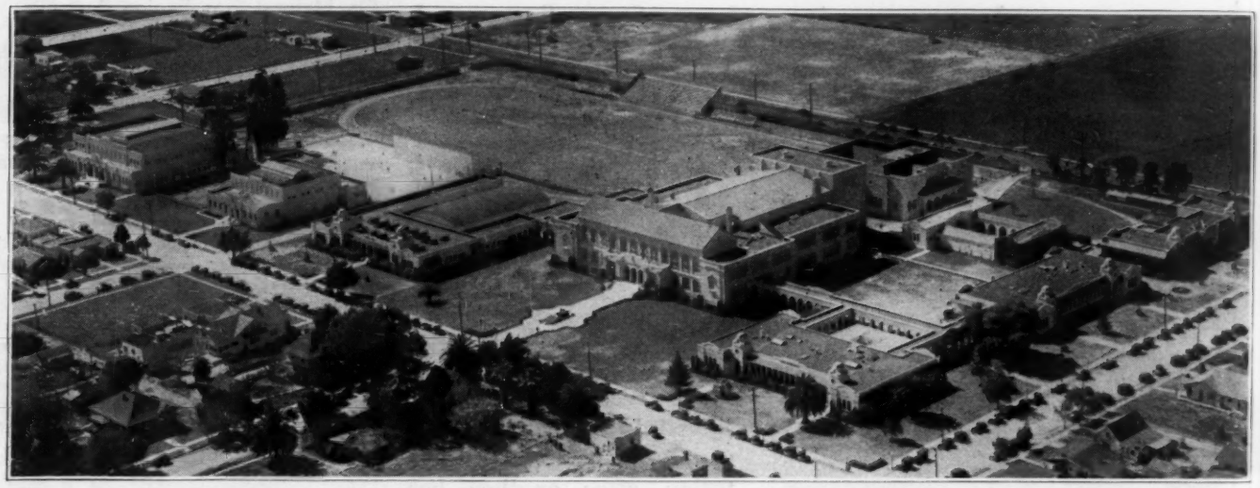
With the windows flung wide open, a brisk work-out is enthusiastically executed by the 25 women and six men of the department. A contest to determine the best amateur drill conductor was recently held, prizes being theater tickets offered by E. E. Stovall, assistant superintendent of the department.

## Minneapolis Gas Light Co. Control Passes to N. Y. Firm

The Minneapolis Gas Light Co., Minneapolis, Minn., on June 12, went under the control of the Chase Securities Corp. and Harris & Forbes Co., both of New York. Controlling interest in the American Commonwealths Power Co., holding company for the Minneapolis firm, is reported to have been secured by the New York interests.

## W. W. Cooper to Have Charge of Rate Proceedings for Commission

Walter W. Cooper has been appointed to the position of supervisor of rate proceedings for the California Railroad Commission, with the title of Director of Research.



*Above is one of the 700 schools in Southern California that are heated with Clow Gasteam — Compton High School, Compton, California*

# MORE THAN 700 CLOW GASTEAM EQUIPPED SCHOOLS IN SOUTHERN CALIFORNIA—PROVE THE ACCEPTANCE OF THIS HEATING SYSTEM

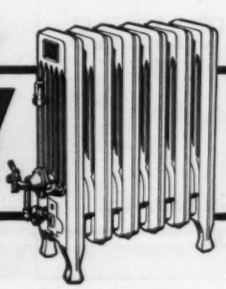
*Schools* . . . form a most important market for Clow Gasteam Radiators. That this market has tremendous possibilities is evidenced by the fact that already more than 700 schools in Southern California alone, are heated with Clow Gasteam.

This heating system offers exclusive advantages. The unit control feature makes it possible to provide steam heat at less cost than with any other system. The simplicity of construction and operation of the radiators assures long life with little or no servicing. The radiators are compact and good looking.

Installation is simple and inexpensive—allowing a considerable merchandising profit on the radiators themselves. Sell your share of this large and profitable market that means a dependable gas consumption and an off-peak load.

JAMES B. CLOW & SONS 201-299 N. Talman Avenue, Chicago

CLOW GASTEAM



Listed by Underwriters Laboratories

Approved by A. G. A. Testing Laboratory

...and now in the far-famed Hotel Saint Francis

...MADSEN

MADSEN ranges are helping San Francisco hostelries make excellent use of their splendid new natural gas supply. One notable institution after another has discarded less advanced kitchen equipment in favor of modern Madsen Ranges, engineered to burn natural gas with the highest efficiency. Now far-famed Hotel Saint Francis turns to Madsen equipment. Thirteen sections of gas-fired Madsen Ranges and four Madsen Broilers replace the old oil-burning equipment in this aristocratic guest house. The investment will all be returned, with handsome dividends, through the superior economy of Madsen equipment, engineered to produce maximum efficiency from natural gas. Madsen engineers will be glad to plan with you to improve *your* kitchen efficiency.

MADSEN

IRON WORKS, LTD.

P. O. Box 601, Huntington Park, California
(Suburb of Los Angeles)
San Francisco Factory Representative
Fred R. Sanford, 631 2nd St.

MADSEN HOTEL & RESTAURANT KITCHEN EQUIPMENT

SOLD BY LEADING EQUIPMENT DEALERS

FORNEY

COMBINATION GAS and OIL BURNERS

For Power Plant and Industrial Uses

Write for Literature
and List of Installations

FORNEY COMBUSTION ENGINEERING CO.

513 CENTRAL BANK BUILDING, DALLAS, TEXAS

## Charter Gas Engine Co.'s Bulletin On Natural Gas Engine Power

Charter Gas Engine Co., Sterling, Ill., has recently brought from the press its Bulletin No. 23—"Natural Gas Engine Power and its Savings over Steam, Electric and Oil Engines."

The booklet contains data on natural gas supply of the United States, comparative power producing value of natural gas and fuel oil and other fuels, advantages of natural gas as a fuel, thermal efficiency of natural gas engines as compared with those powered by other fuels, and a comparison of operating costs of electric power and natural gas engines. A table of representative industrial rates is also given, as well as a table of comparative fuel cost for different types of prime movers. Other tables give data on power for pumping plant operation, cotton gin operation, and ice plant operation. The brochure also describes the various models of the Charter gas engines.

## Wastage of Gas on Decrease In California in 1931

In a report submitted to the California Railroad Commission recently, by Claude C. Brown, gas and electric engineer of the commission, on the production, utilization and wastage of natural gas in the state during the first quarter of this year, as compared with the first quarter of 1930, it was shown that while there has been an increase in the amount of natural gas utilized there has been a decrease in the amount of gas produced and in the amount wasted. Following are the totals for the corresponding quarters of 1930 and 1931:

| *Period* | *Production* | *Utilization* | *Wastage* |
|---|---|---|---|
| 1st Quarter, 1930 ..... | 156,039,000 | 83,649,000 | 72,390,000 |
| 1st Quarter, 1931 ..... | 106,502,000 | 84,825,000 | 21,677,000 |

## May Establish Carbon Black Plant in Alberta, Canada

Establishment of a carbon black plant near Edmonton, Alberta, is contemplated by New York interests, according to L. Jerome Floum, partner in the financial firm of K. D. Johnson & Co., Wall Street, New York, who has been in Alberta recently to confer with Premier J. E. Brownlee and William Calder, director of petroleum resources, with regard to the proposed plant.

Should prospects seem favorable, a survey of the gas fields of the province and a study of other industrial factors will be carried out before a site is decided upon.

## Smithville Gas & Service Co. To Serve Smithville, Mo.

A certificate of convenience and necessity has been granted by the Missouri Utilities Commission to the Smithville Gas & Service Co., Smithville, to install and operate a gas distributing system in that town for the service of natural gas. The company has a franchise and has contracted for the purchase of its natural gas with the Arrow Pipe Line Co.

## W. F. Srygley Transferred From Dallas to El Paso

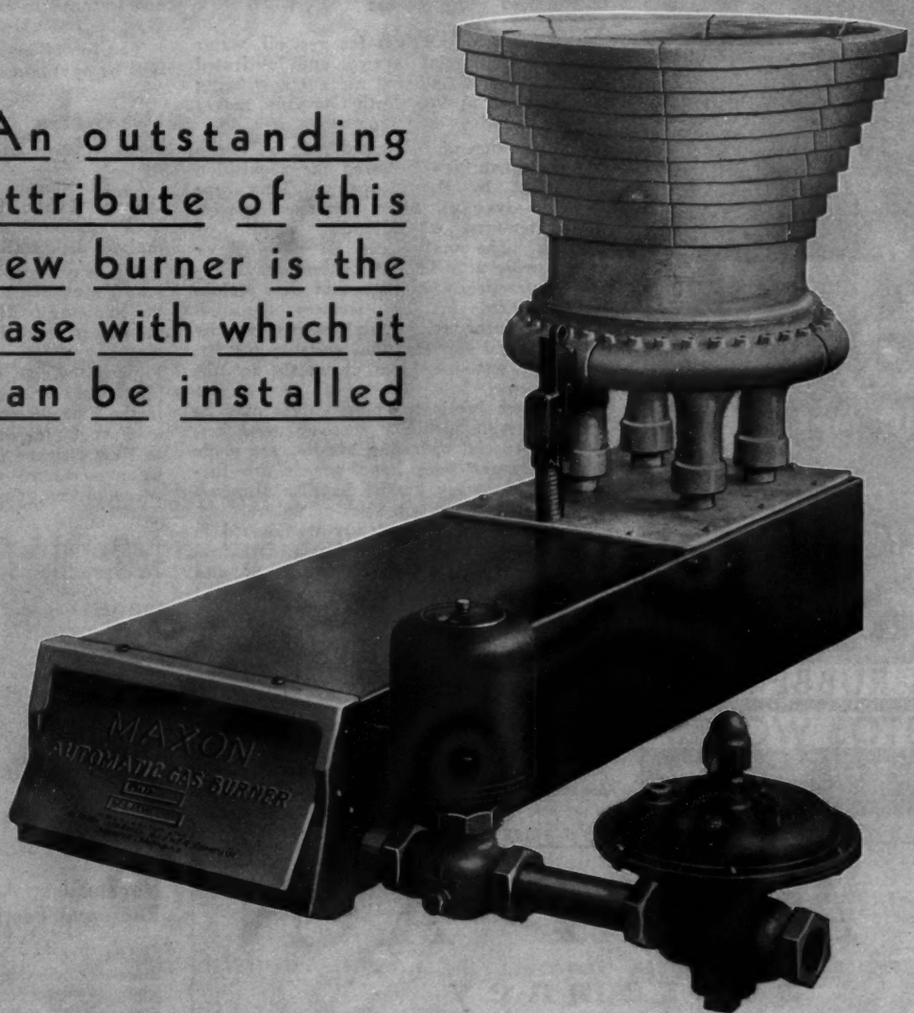
W. F. Srygley, formerly assistant shop foreman of the Dallas Gas Co., Dallas, Texas, has recently been transferred to El Paso, as shop foreman of the Texas Cities Gas Co.

Announcing the new

# MAXON
## AUTOMATIC GAS BURNER

Equipped with Full Automatic Control and Safety Pilot

An outstanding attribute of this new burner is the ease with which it can be installed



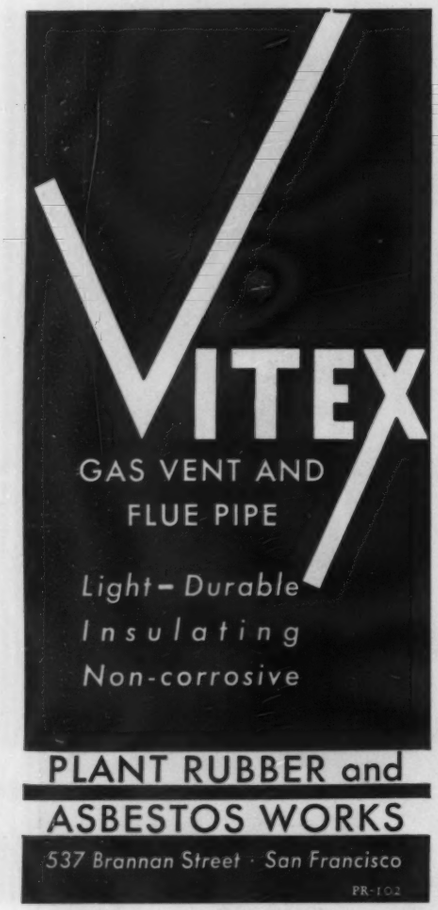

MAXON PREMIX BURNER COMPANY

MUNCIE, INDIANA

Detailed description and prices sent upon request

# Rate Reduction for Oklahoma Natural

DOMESTIC rates for natural gas in all cities and towns in Oklahoma served by the Oklahoma Natural Gas Corp. will be reduced to a maximum of 50 cents per 1000 cubic feet as a result of an agreement between officials of Oklahoma Natural, Governor Wm. H. Murray, and Chairman Paul Walker of the Oklahoma Corporation Commission. The reduction was made voluntarily by the company. New rates are temporary and are to become effective July 1. The agreement will not operate to increase rates in any town where present rates of the company are less than 50 cents. Under the agreement the governor dismisses his suit filed in the supreme court for a receivership against the Oklahoma Natural and the company dismisses its suit filed in the federal court to prevent the Corporation Commission from enforcing its temporary rate for natural gas for the months of February, March and April, 1931. The commission is to continue its general investigation to determine upon final rates to be charged by the company throughout the state. The commission also reserves the final adjudication of the proper rates for February, March and April, 1931, to be determined in connection with the general investigation. The temporary rate reduction is expected to effect a saving of approximately $1,000,000 to gas consumers of the state.




## Walworth Company Adds Lubricated Plug Valves

Lubricated plug valves for gas, oil, water and other industrial service, and lubricated service cocks for gas and air are now being manufactured by Walworth Company, maker of valves, fittings and pipe tools.

The addition of lubricated plug valves to the Walworth line followed the acquisition of patents by the company. This type of valve gives full, direct port opening with a quarter-turn of operating handle or wrench. The valves can be throttled or opened wide at will. The valves are available in practically all types and sizes and in metals suited for the services required. They are furnished for high as well as low pressures and for vacuums, suitable for air, oil, water, gasoline, gases, chemicals, hot tar, hot oils, etc.

Walworth lubricated plug valves may be operated with ordinary monkey wrenches, although special operating handles are made and on larger sizes hand wheels are furnished. Planetary geared handles also can be furnished on certain sizes of valves.

A 20-page catalog recently was issued in which the company's line of iron and steel lubricated plug valves are described and illustrated.

## Line Under Way to Serve Lake Arrowhead Village

Natural gas will soon be available at mile-high Lake Arrowhead, according to an announcement of the Southern California Gas Co. of Los Angeles, Calif. Work has started on the construction of a 4-inch high pressure pipe line which will extend from the end of the present line at Arrowhead Springs to Arrowhead Lake Village. A distribution system will carry the gas to consumers in the village and surrounding territory.

The line, which will be approximately 8 miles long, will follow the old steep and rugged Daly Canyon road, as this affords the most direct route of approach to Lake Arrowhead. Construction of this line up the mountain side presents some difficult engineering problems. Company officials estimate that about a month or six weeks will be required to complete the job.

Plans for supplying natural gas to Lake Arrowhead have been considered by the company for some time, but not until this season has the consumer demand in that territory justified the undertaking. It is estimated that 10,000 persons spent the Memorial Day weekend in the Lake Arrowhead section. The resort now has four hotels, with accommodations for about 550. There are also two camps affording cottage accommodation for 600 more, and many privately owned homes and cottages, to all of which natural gas will soon be available.

The initial investment on this construction will be approximately $100,000.

## Nairne Now Asst. Engr., Gas Dept., New Orleans Pub. Service Inc.

C. L. Nairne, gas engineer of the New Orleans Public Service Inc., has recently been appointed assistant chief engineer of the gas department of the company.

Mr. Nairne is a graduate engineer of Tulane University, and was first connected with the company in 1924 as a student engineer in the power plant. In 1926, Mr. Nairne left the company to go with the Florida Power & Light Co. as an engineer engaged in power plant work and later as betterment engineer in the Florida company's steam electric plant at Fort Lauderdale, Florida. He returned to New Orleans Public Service Inc. in 1928, being connected with the gas department as a combustion engineer.

## P. G. and E. Complete; Line To Spreckles Sugar Factory

Pacific Gas and Electric Co., San Francisco, Calif., recently completed construction of a 5-mile, 12-inch gas transmission line to serve the Spreckles Sugar Co., near Salinas. The line cost P. G. and E. approximately $82,500.

The beet sugar factory is expected to consume between 12,000,000 and 16,000,000 cubic feet of gas daily during the late summer and early fall, or more than the daily consumption in the cities of Sacramento, Berkeley and San Jose combined.

## Himmelblau, Agazim Co. to Represent Peerless in Chicago

The Peerless Heater Co., Boyertown, Pa., announces the appointment of the Himmelblau, Agazim Co., 30 N. Dearborn Street, Chicago, Ill., as sales and service representative for the Chicago district in northern Illinois and eastern Indiana.

## W. A. Gillespey, Transferred To Ozark Distributing Co.

Walter A. Gillespey, for the past two years manager of new business at Western Distributing Co.'s property at Madison, Kan., has been transferred to a similar post with the Ozark Distributing Co., Carrollton, Mo.

TAPPAN
Supremacy
is not a newly-won achievement, but an old and accepted standing in the eyes of gas appliance men and the public alike. No other gas range combines so many outstanding superiorities into such a perfect whole—the TAPPAN Insulated Oven gas range.
H. R. Basford Co. 665 Howard St. San Francisco
H. R. Mayer 1001 E. 1st St. Los Angeles
F. W. Schwab 2512 N. Stevens Tacoma

# The SHEER 31-A GAS VALVE

## . . . a new electric motor gas valve with advanced features . . . and lower prices . . .

The New Sheer Motor Gas Valve gives every feature ever offered PLUS important advancements — yet at lower price.

1. Automatic shut off if current fails.
2. Provision for manual operation with automatic reengagement.
3. Only a fraction of the usual current consumption.
4. Motor always cool—no sticking from heat thinned lubricant.
5. Lever for control of secondary air damper.
6. Extra strong gear transmission—not a failure in two years.
7. New power characteristics.
8. Separate transformer with low voltage secondary circuit—easier and cheaper to install.
9. Two wire circuit.
10. Fewer electrical contacts.
11. Most compact motor valve ever built.
12. Built in switch for booster fan control.
13. Motor adjustable to different positions on valve body.
14. Damper arm adjustable for reverse action if desired.
15. Lower price.

WIRE OR WRITE FOR FULL DETAILS AND PRICES

**H. M. SHEER CO. QUINCY, ILL.**

ESTABLISHED 1889

*WHY NOT FOR YOU?*

# ALCO LAVA

**PILOT TIPS AND BURNER HEADS**

***Innumerable Styles Are Being Made by Us for Gas Appliance Manufacturers***

**INDUSTRIAL GAS BURNERS FOR PIPE BURNERS**

Our patented lava tips for natural and manufactured gas are specified for many industrial uses, including smoke houses, core ovens, japanning ovens, soft metal ovens, etc. The lava tip will not corrode, oxidize, soot or otherwise become clogged. It is preferable to metal tips, particularly where natural gas is used and, barring accidents, is practically everlasting.

**FOR ARTIFICIAL**
**U. S. Pat. No. 1498644**
**ALCO Type-C Tips**

**Specify**

**FOR NATURAL**
**U. S. Pat. No. 1769831**
**ALCO Type-N Tips**

***Send for New Gas Book No. 31***

## AMERICAN LAVA CORPORATION

**1431 Williams St.** **Chattanooga, Tennessee**

*Illustration through courtesy Chicago Daily News.*

## Natural Gas from Texas to Chicago

Finishing the last section of a pipe line 960 miles long between Chicago and the fields of Amarillo. This section of the line was treated with the NO-OX-ID Master Coat for the Will-Cook Construction Company.

The NO-OX-ID Master Coat consists of:
(1) Dearborn Pipe Mill Coat.
(2) NO-OX-ID "G" Special.
(3) NO-OX-ID-IZED Wrapper.
(4) NO-OX-ID Service Coat.

Let us submit facts and estimates on both new and reconditioning work.

**Dearborn Chemical Company**

**LOS ANGELES:**
**807 Mateo Street** **Phone TRinity 3385**
**SAN FRANCISCO:**
**421 Bryant Street** **Phone DAvenport 658**

**The NO-OX-ID MASTER COAT**

**Electrogas**

**ELECTROGAS announces the completion of the first unit of its new factory, speeding up production to care for increasing demand**

**Write for Our Attractive Dealer Proposition**

**ELECTROGAS FURNACE CO.**

**466 Sutter St., San Francisco**

**Factory**
**Bay Shore Boulevard**
**San Francisco**

### A. G. A. Receiving Applications For Charles A. Munroe Award

Applications for the Charles A. Munroe Award, which is a national recognition for achievement in the gas industry, are being received by the American Gas Association, 420 Lexington Avenue, New York. The award will be made to the individual who is found to have made the outstanding contribution toward the advancement of the gas industry during the period from July 1, 1930, to June 30, 1931.

Under the terms governing the award, the most conspicuous contributions to the general interests of the gas industry would include the following: Research, invention, operating methods or practices which reduce cost of production, transmission and distribution, improved distribution or other service, increased sale of gas, development of new uses for gas, improved public and employee relations, promotion of safety, development of improved accounting practices, widening the field of gas making materials, new methods of manufacture, finance, publicity, new gas works products and by-products, rates, etc.

### Florence R. Rush Home Service Advisor for Oklahoma Natural

Florence R. Rush has been appointed home service advisor for Oklahoma Natural Gas Corp., Tulsa, Okla.

Miss Rush is a graduate of the University of Minnesota, School of Business, and following graduation, was appointed to the staff of the Peoples Light & Power Corp. When that company was taken over by the G. L. Ohrstrom Co., present financiers of Oklahoma Natural, Miss Rush went to New York as secretary to L. O. Gordon, vice-president.

Following her appointment to the staff of Oklahoma Natural, Miss Rush completed the organization of a group of women employees known as the "Oh-En-Gees." Various study courses are being followed as means of acquainting women employees with the needs of consumers.

### Payne Furnace & Supply Co. Appoints Two New Representatives

Harry Thorpe has been appointed by the Payne Furnace & Supply Co., Inc., Beverly Hills, Calif., to represent the company in the states of Missouri, Kansas, Nebraska and Iowa. Mr. Thorpe will have his headquarters at 304 North Delaware St., Independence, Mo.

Oscar Wagner will represent the company in the states of Tennessee, Kentucky, southern Ohio, Indiana and Illinois, and will maintain headquarters at 682 South 43rd St., Louisville, Ky.

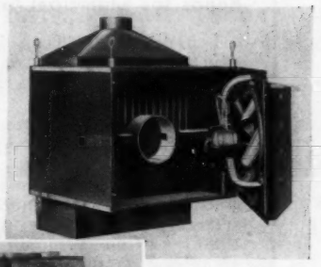
### Leo H. Booch Establishes Manufacturers Agency in Dallas

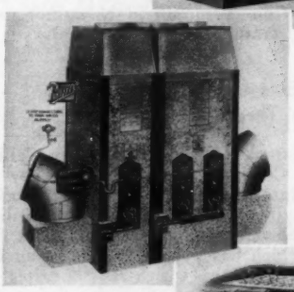
Leo H. Booch, for the past 20 years manager and president of the Bridge & Beach Mfg. Co., St. Louis, Mo., which company has recently been reorganized on a reduced scale, has returned to Dallas, Texas, to resume the manufacturers' agency business in which he was successfully engaged prior to 1911.

### Comptroller of General Utilities

G. U. Force has been named comptroller for the General Utilities Co., of Kansas City, Mo.

# Why • • •
# We favor Gas For Heating





BECAUSE—We are convinced that gas is the ideal fuel for all heating purposes, PAYNE Furnace Company makes nothing but gas furnaces and other gas heating units.

BECAUSE—PAYNE customers must be satisfied with the fuel as well as with the furnace—PAYNE furnaces are made for gas only. The dependability, the cleanliness, the convenience, the instant-readiness and the economy of gas heat is a vital factor in the development of the furnace business.

BECAUSE—A vital factor in the development of the gas utility business is the durability and the dependability of gas appliances the best interests of gas company and furnace company are closely interlinked. Gas companies must be positive that their customers will be absolutely satisfied with the furnace if they are to be satisfied consumers of gas for heating purposes.

*We invite the closest scrutiny of PAYNE furnaces by every experienced gas man, engineer, salesman, home service representative or public relations expert.*

**We submit that the gas industry NEEDS to have its consumers satisfied and we point out that this satisfaction is determined, in large measure, by the QUALITY of the APPLIANCE in the home of the consumer.**

**We are proud of the QUALITY of PAYNE products.**

***When writing for information regarding PAYNE equipment mention Western Gas.***

**Dealers**

**The Payne Gas Furnace Franchise for your town may be open. White today for new Catalog and Proposition!**

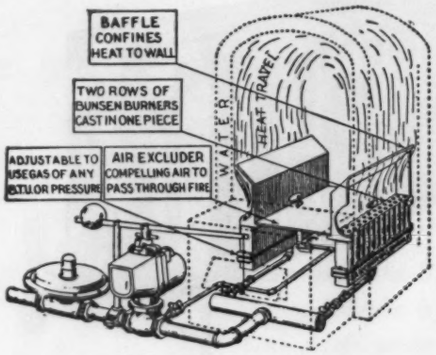
## PAYNE FURNACE & SUPPLY CO., Inc.

**Beverly Hills, California**

***There is a "Payne Heat" System for Every Building and Climate!***

**Payne Heat**

**Factory Units**
**Unit Furnaces**
**Floor Furnaces**
**Central Furnaces**
**Pipeless Wall Units**
**Industrial Installations**


BAFFLE CONFINES HEAT TO WALL
TWO ROWS OF BUNSEN BURNERS CAST IN ONE PIECE
ADJUSTABLE TO USE GAS OF ANY B.T.U. OR PRESSURE
AIR EXCLUDER COMPELLING AIR TO PASS THROUGH FIRE
WATER
HEAT TRAVEL

**Perfect combustion correctly applied insures maximum efficiency**

***Noiseless, Sootless***

**Ideal for any size cast iron and fire-box boilers.**

**FAUCHER GAS BURNER, INC.**
**Box 5031 Dallas, Texas**

## Newman Gas Equipment Co.

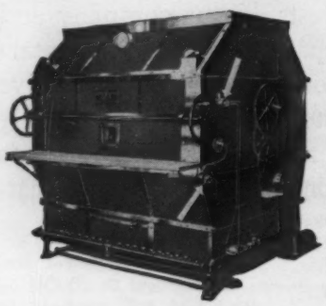
**Industrial and Commercial Burners**

**Upshot Burners for Ideal Boilers**

**Bailey Regulators for Gas Fuel and Pressure Regulation**

**447 Sutter Street San Francisco Ph. GA 7833**

# McDonald Ovens Are Gas Business Builders



In keeping with the modern trend in all lines, the Bruce McDonald Company is making it possible for the progressive baker to enjoy the benefits and efficiency of gas heat. The 1931 McDonald-Made Meek Reel Oven has thermostatic heat control and is economical enough in its fuel consumption to make it a practical oven for the average baker. We will help you sell the bakers in your community on burning gas. Send for complete information. Use the coupon below.

**BRUCE McDONALD COMPANY**
*Also Manufacturers of* **RED DEVIL OVENS**
**Kansas City, Mo.**

**(Warehouse stock and branch office in Los Angeles)**

**BRUCE McDONALD CO.**
**2019 Washington St.**
**Kansas City, Mo.**

Please send me complete information on McDonald-Made Meek Reel Ovens and on Red Devil Cabinet Ovens.

Name .....
Firm Name.....
City ..... State.....

### Lukens Nickel Clad Steel Plate Is New Product On Market

The International Nickel Co. and the Lukens Steel Co., of Coatesville, Pa., announce the placing on the market of a new product, a hot-rolled bi-metal of nickel and steel which is being sold under the trade name of "Lukens Nickel-Clad Steel Plate." The percentage of pure nickel is furnished in various grades from 10 per cent to 20 per cent of the total plate thickness. The product is applicable in tank car construction, for large diameter pipe, tanks, condenser shells, water heaters, stills, etc.

A bulletin was recently published by the company announcing the new product, and may be obtained by sending a request to the above address.

### Miami Authorizes $150,000 Bonds for Municipal Gas System

Issuance of $150,000 in bonds for construction or purchase of a municipal gas system was authorized in an election at Miami, Okla., recently. At the same time citizens authorized creation of a public utility board of four members to supervise construction, development, maintenance and operation of the proposed gas utility and other municipal departments. The city has entered into an optional arrangement to purchase gas from a supply in Nowata county, 40 miles distant from Miami.

### Natural Gas Utilities Now Operates Three Companies

The Skiatook Service Co. and the Collinsville Gas Co. have been taken over by the Natural Gas Utilities Co., with district offices at Collinsville, Okla. Natural Gas Utilities Co. is a subsidiary of the Central States Edison Co., which has purchased the Sedan Gas Co. of Sedan, Kan., which still operates under that name, district offices for Sedan Gas Co. being Collinsville, Okla., and a local office at Sedan under the direction of D. R. Hawkins.

### Net Gain for 1930 Announced By Montana Cities Gas Co.

Montana Cities Gas Co., pipeline branch of the Northwest States Utilities Co., which supplies Great Falls, Mont., with gas from northern Montana, made a net profit of $56,872 during 1930, according to its annual report filed recently. The concern, headed by C. C. Yawkey of Wausau, Wis., has an investment of $2,970,520 in Montana, according to the report.

### Pacific Gas and Electric Co. Completes Cannery Installation

Pacific Gas and Electric Co., San Francisco, Calif., reports the installation of natural gas equipment at the Sacramento cannery of Libby, McNeil & Libby, one of the largest packing plants in the world. The fuel had previously been installed in the Oakland and Sunnyvale plants of the company.

### H. R. Bowers Now With The Meriam Co.

H. R. Bowers, formerly with the Bailey Meter Co., is now manager of sales and advertising for the Meriam Co., Cleveland, Ohio, manufacturers of flow meters.

# Sell Basements *Transformed by Gas!*

Are you going to cash in on the increasing demand for new heating **convenience, comfort** and **economy?**

Now is the time to do it—with Barber Conversion Gas Burners, the utmost in automatic heating efficiency—AT A PRICE THAT EVERY HOME CAN AFFORD.

Made for any steam or hot water heating installation. Simply send us the Name of the boiler manufacturer, the Trade Name and the Number and we'll send you a TAILOR-MADE GAS HEATING JOB FOR THAT BOILER.

For warm air furnaces, too! Every home with a central heating plant is a prospect—a ready prospect for the convenience of BARBER gas heat. Low in first cost, low in operating cost, highest in efficiency and economy.

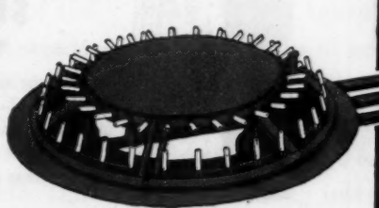
HOME OWNERS ARE DEMANDING THE CONVENIENCES OF AUTOMATIC HEAT AND GAS IS THE LEAST BOTHERSOME.

It makes new rooms out of the basements that are now nothing more than filth accumulators.

Thousands of Barber Conversion Gas Burners are now in operation—have been for more than a dozen years.

Why not get our complete details today. JOIN IN THE PROFITS AND GOOD WILL THAT BARBER BURNERS WILL MAKE POSSIBLE FOR YOU!

*Write Today!*



**THE BARBER GAS BURNER COMPANY**

3702-04 SUPERIOR AVE.

CLEVELAND :: OHIO

**BARBER**
***Automatic Jet Gas***
**BURNERS**

# The Pittsburg A Famous Boiler

**The crowning engineering achievement in the gas boiler industry has been the design and perfection of the famous "Pittsburg" Boiler, the most advanced gas-fired house-heating boiler of the day.**

**Hundreds upon hundreds of installations have definitely proven the superiority of the "Pittsburg," achieving a fame that is rapidly spreading to all parts of the country.**

**Back of the design and construction of the "Pittsburg" Boiler rests the manufacturing resources of the worlds' largest water heater manufacturers—The Pittsburg Water Heater Company.**

**The "Pittsburg" label on these boilers is your assurance of the highest mechanical and engineering perfection, a service organization that extends into every town and city of any importance in the land, and an iron-bound guarantee of proven dependability.**

**Just as "Pittsburg" Water Heaters have demonstrated their superiority, so you will find "Pittsburg" Boilers rendering unsurpassed service wherever installed.**

***Write for booklet, prices and discounts.***

**"Efficient House Heating With Gas."**
**"Pittsburg House Heating Boilers."**

**Pittsburg Water Heater Company**
**Factory and General Office: Pittsburgh, Pa.**
***Offices in all principal cities.***

**For smart living...this exclusive apartment hotel in the heart of the famous Wilshire District, overlooking beautiful Westlake and Lafayette Parks.**

***Hotel Rooms from $5 up***
***Apartments from $150 up***
***American Plan from $8 up***

The Arcady
2619 WILSHIRE BLVD.
LOS ANGELES



*New Low Rates in* HOLLYWOOD

$3 ROOM WITH BATH
$4
$5

Right in the heart of Hollywood—with interesting places to go—people to see and things to do.

*Write for Booklet. Vacation Bureau*

ROOSEVELT HOTEL
ROBERT J. McCABE, MANAGER
HOLLYWOOD, CALIFORNIA


## The Application of Heat to Core Baking

A new illustrated booklet, "The Application of Heat to Core Baking," has just been published by the Committee on Industrial Gas Research of the American Gas Association, of which F. J. Rutledge is chairman. The booklet is the work of H. L. Campbell, associate professor of Metallurgical Engineering, University of Michigan. Professor Campbell's research in measuring the effect on the strength and other properties of foundry cores of convected heat as compared with radiated heat, and his previous researches in measuring the physical characteristics of cores and core binders, have served as a basis for the text. The subject matter has been carried from this point to a discussion of materials used in making satisfactory cores, especially core binders. Good foundry practices as regards core ovens are emphasized and explained.

The book is well illustrated showing in detail how foundry cores are mixed, baked and tested and in addition the various types of ovens most suitable for meeting the conditions found in both large and small foundries are shown.

The book is available at a nominal charge at American Gas Association, 420 Lexington Avenue, New York, N. Y.

## Third International Conference on Bituminous Coal Nov. 16-21

The Third International Conference on Bituminous Coal will be held at the Carnegie Institute of Technology, Pittsburgh, Pa., next November 16 to 21. Of the overseas nations, Germany, England and France will send the largest delegations.

New developments in fuel technology and utilization will be explained and discussed.

The tentative program outlined by the conference committee places emphasis on the economic side of the coal industry. A discussion of the competition between coal, petroleum, and natural gas will have an important place in the program.

## Ohio Oil May Purchase Gas Properties in Idaho

Reports are current in the press to the effect that the Ohio Oil Co., Casper, Wyo., is negotiating with the Mountain States Oil & Gas Co. to take over the latter company's holdings in the Crystal Dome structure near Weiser, Idaho. The Ohio Oil Co. is reported to have had a party of engineers and geologists in the field for the past several weeks. Mountain States bought the properties of the Crystal Dome Oil & Gas Co., which brought in the first gas well on the structure.

## To Use Gas in Chemical Plant at Kettleman City

California Power & Chemical Co. is reported to be planning construction of a plant to make commercial fertilizer and generate electric power by use of gas from the Dudley Ridge area. According to the report, the plant will be built near Kettleman City, gas supply coming from the wells of the Kettleman Lakeview Oil & Gas Co. The load is estimated at 10,000,000 cubic feet daily.

## Escalon on "Natural" Service

Pacific Gas and Electric Co., San Francisco, Calif., has completed laying mains for natural gas service in Escalon, with service expected to begin immediately.

# HE LOOKED 5 YEARS AHEAD...

## *and found gas refrigeration the best load builder!*

*He thinks gas refrigeration best load builder. Mr. Hugh Cuthrell, Manager, New Business Department of Brooklyn Union Gas Co.*

HOW many MCF do you plan to add during the next five years? More important, *how are you going to add them?* One progressive gas company official, Mr. Hugh Cuthrell of Brooklyn Union Gas Co., says refrigeration is the best bet, and here's why:—

> "No matter how we look at it, with existing Brooklyn gas rates, gas refrigeration offers the biggest load-building possibility for the next five years. House heating, water heaters, incinerators, clothes dryers, while good load builders, are mainly sold to residents and owners of individual homes. Refrigerators, like gas ranges, can be sold to both apartments and home owners. The market for refrigeration overshadows all other load-building appliances."

Gas companies that put merchandising efforts behind gas refrigeration get a double return on their efforts. First, the profit from the sale of the refrigerator. Second, the year in and year out steady load that is built up. Brooklyn Union Gas Company have added and will continue to add thousands of MCF each year through gas refrigeration.

"How can our company really get into this refrigeration market?" you ask. That's not difficult. Right now, waiting for you, is a simple sales plan—Plan B—that has been developed from a study of the methods of gas companies with outstanding refrigeration sales records.

### A *PRACTICAL* PLAN

Plan B has taken into consideration not only the best ways of getting refrigerators on the lines, but the present business situation as well. It is an economical plan. Instead of calling for great outlays of money, it calls for systematic use of time. Sales planning instead of sales costs! A brief note will bring Plan B to your desk. Address Electrolux Sales, Inc., Evansville, Ind.

*A tiny gas flame takes the place of all moving parts*

**ELECTROLUX** THE *Gas* REFRIGERATOR

**THE BABY DIGGER**

**The Ideal Modern Way To Dig Gas Trench!**

Cleveland Baby Diggers are unequalled for downright usability and trenching satisfaction. Compact — transportable — economical. Tough — fast — dependable. Precision built of finest materials. A wheel type trencher on full crawlers. You'll find Cleveland Trencher pioneering the features that count. Write for particulars.

**THE CLEVELAND TRENCHER COMPANY**
"Pioneers of the Small Trencher"
20100 St. Clair Ave.
Cleveland, Ohio, U. S. A.
Distributed By
Edward R. Bacon Co., San Francisco, Cal.

**DEPENDABLE PROTECTION for Pipe Lines**

McEVERLAST Coatings
+Mechanical application
+Engineering service
=Complete,
Dependable
Protection

**McEVERLAST, Inc.**
111 West 7th St. Russ Building
LOS ANGELES SAN FRANCISCO

**IMUNOL**
Reg. U. S. Pat. Office
U. S. and Foreign Patents Granted

**WILLIAMS GAS STEAM RADIATOR**
Made in 22 sizes from 26 to 180 feet of rating.
IMMEDIATE HEAT AUTOMATIC LIGHTER
Improved Combustion. Positive Gas Control.
*Write for descriptive matter and prices.*
**WILLIAMS RADIATOR COMPANY**
1865-1873 Cordova St. Los Angeles, Calif.

## W. P. Hutchinson Elected President of Sprague Meter Co.

*W. P. Hutchinson*

AT the annual meeting of the stockholders of the Sprague Meter Co., held at the company's office in Bridgeport, Conn., June 3, W. P. Hutchinson was elected president, and A. I. Ayre, secretary and treasurer. Mr. Hutchinson came to Bridgeport from Marion, Iowa, in 1911 as sales manager of the company, and became its vice-president in June, 1912.

H. H. Sprague, who has been president of the company since its inception in 1900, was elected chairman of the board.

## D. C. Shaffer Made Vice-President of Memphis Natural Gas

Memphis Natural Gas Co., affiliated with Appalachian Gas Corp., announces that D. C. Shaffer, general manager of the company, with headquarters in Memphis, has been elected vice-president. Mr. Shaffer who was born in Williamsport, Penn., has been connected with the natural gas industry for 34 years, beginning his career with the Buffalo Natural Gas Co., in 1897, remaining with this and other Standard Oil properties until 1910, when he joined Columbia Gas and Electric Corp. He became manager of Memphis Natural Gas Co. at the time of its organization in 1928.

## Canadian Western Declares Extra Stock Dividend

Canadian Western Natural Gas, Light, Heat & Power Co., Ltd., of Calgary, Alberta, recently declared an extra dividend of 50 cents per share in addition to the regular quarterly dividend of $1.00 per share to holders of common stock on record April 15. This is the second extra dividend which the company has paid this year, regular and extra dividends in the same amounts being paid on January 15.

## A. G. A. Exhibit Space Selling Rapidly

More than 85 per cent of the space provided has been allotted to manufacturers of gas appliances, who will participate in the annual exhibition to be held in conjunction with the 13th Annual Convention of the American Gas Association, Atlantic City, N. J., October 12-16, according to an announcement made recently by C. W. Berghorn, director of exhibits.

## Wasatch Gas Co. Moving 1,500,000 C. F. Holder

According to word received from L. Fitzpatrick, vice-president and general manager of the Wasatch Gas Co., Salt Lake City, the company is dismanteling and moving a 1,500,000 cubic foot gas holder from its former location to a new site on the Columbia Steel Company's property at Ironton, south of Provo, Utah. The holder will be placed in service by October 1.

***Right—Reproduced in small size are two gas appliance advertisements which are designed to direct prospects to dealers' stores. These ads., each 2 columns by 11 inches, will appear during July.***

# DEALERS!

## *Are you getting your share of this great*

# APPLIANCE MARKET?

**INSTANT hot water washes away your troubles ...quickly and easily**

AT THIS TIME OF THE YEAR, you'll appreciate instant hot water more than ever. You can keep things sweet and fragrant easier because you do not wait for water to heat. The time you save can be spent in healthful summer recreation. Then too, there are no fires to build, no hot kitchen when you heat water automatically.

***Automatic Gas Water Heater Needs No Attention***

Once you have an automatic gas water heater you'll never do without it. The thermostat turns the gas on and off and keeps the water at 140 degrees day and night. Just turn a faucet and draw a tub-ful or a basinful of hot water—no delay or bother. The water stays hot because the boiler is insulated. No gas wasted.

An Automatic Gas Water Heater

As for cost, instant hot water is the lowest of any method of heating water in the home. It amounts to less than one-fifth of a cent per gallon.

Why not stop in today and see the automatic gas water heaters? One may be purchased for a small sum now and the balance in monthly payments.

***Local dealers also sell Automatic Gas Water Heaters***

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

Owned · Operated · Managed by Californians ·

**Plenty of hot water *instantly* saves Mother's time for pleasure!**

IT'S EASY to finish the housework in a jiffy when there is an abundant supply of hot water. Each day you save countless minutes. Each week there are additional hours for motoring, shopping, or other pleasures.

***No Need of Watching the Automatic Gas Water Heater***

With an automatic gas water heater a thermostat turns the gas on and off. It keeps the water at 140 degrees day and night. At any instant you can have deep hot water for bathing, a basinful for shaving—just as in the fine hotels and apartment houses. The water in the tank stays hot because the tank is insulated. No gas wasted.

An Automatic Gas Water Heater

This instant hot water service costs less than one-fifth of a cent per gallon—the lowest cost of any method for heating water in the home.

You can have this instant hot water service installed in your home for a few dollars down, balance in easy monthly payments. For full details telephone or call at our office.

***Local dealers also sell Automatic Gas Water Heaters***

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

Owned · Operated · Managed by Californians ·

At the beginning of this year, Pacific Gas and Electric Company made an estimate of the gas appliance market which would be created for dealers. The estimate is as follows:

| | |
|---|---|
| Gas appliances | $ 5,375,000 |
| Value of piping and sheet metal work incident thereto | 1,500,000 |
| Total market | $6,875,000 |

Organized effort by the entire industry—utility, appliance manufacturers, jobbers and DEALERS—is essential, however, if the maximum amount of business is to accrue to each group through creation of consumer acceptance of gas appliances. Accordingly, Pacific Gas and Electric Company is creating this consumer acceptance and new prospects by intensive advertising throughout the year.

During the month of July, P. G. and E. gas appliance advertising will *sell* the advantages of using gas water heaters and will continue to direct prospects to dealers' stores. You can get your share of this forthcoming market by running your own advertisements beside ours . . . telling these new prospects WHERE they may buy gas water heaters.

Your local newspaper offices will be glad to furnish you with the exact publication dates of P. G. and E. advertisements; call them each week—or at any time you wish to direct prospects to your store with tie-in advertising.

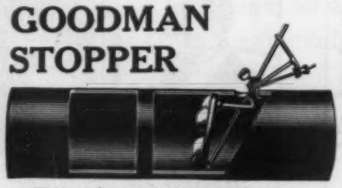
**PACIFIC GAS AND ELECTRIC COMPANY**

**P·G·and E·**

**Owned · Operated · Managed**
***by Californians ·***

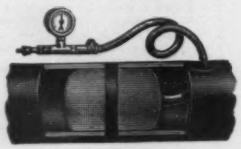
209-731 WG

THE
GOODMAN
STOPPER



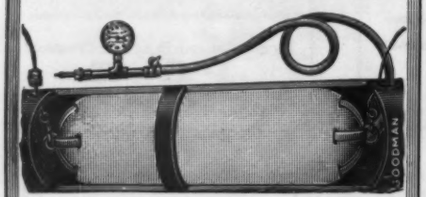
WHEN LOCKED IN PLACE IT HOLDS

DEPENDABLE GAS
MAIN BAGS



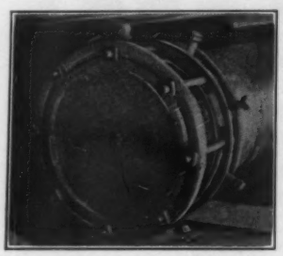
Type C

GOODMAN CYLINDRICAL
STOPPER FOR INTER-
MEDIATE PRESSURE



Increased Length for Increased Pressure

KRUPA-HENDRY
TEST CAP



For Testing High Pressure Lines

SHIPMENTS FROM STOCK

SAFETY GAS MAIN
STOPPER COMPANY

523 Atlantic Avenue
BROOKLYN, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
135 Bluxome Street, San Francisco
California

# CLASSIFIED ADVERTISING

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge.

## SITUATIONS WANTED

Salesmanager and supervisor experienced in merchandising and promotional work, desires position. Has also had experience in domestic and commercial sales of load building appliances. Prefer to locate in central states in natural gas area where there is opportunity to promote extensions and build up sendout. References furnished. Address Box 143, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Gas engineer—technical graduate, married, experienced in operation of coal and water gas plants, distribution, plant design and construction, expert operation and appraisals, desires connection with operating or engineering company. Address Box E-145, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Gas heating engineer-salesman; experienced in layout, estimating, design and installation. Twelve years of heating experience; 3 years manufacturer's representative on coal furnaces; 2 years on natural gas change over. Familiar with competitive fuels. Address Box E-141, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Sales manager, 9 years experience in merchandising for natural gas distributing companies, desires sales position on Pacific coast. Has handled house-heating, commercial and domestic sales. Applicant would also accept position as manufacturer's representative. Address Box E-131, *Western Gas,* 124 West Fourth St., Los Angeles, Calif.

Salesman desires position. Has had 2 years experience in Kansas City in appliance and house-heating sales, also 10 years experience in selling other lines. Will not sell stock. Prefer new property. Applicant can furnish good references. Apply Box E-128, *Western Gas,* 124 West Fourth St., Los Angeles, Calif.

Accountant, with 10 years experience in all branches of public utility accounting including both gas and electric utilities, desires position. Applicant is 30 years of age and is capable of office management or any other utility accounting work. Can furnish references. Addresses Box E-137, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Man with 7 years experience in orifice meter work desires to make a change in location. Applicant has had technical education. Address Box E-139, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Man, 27 years old, strong, energetic, single, desires position. Has had over two years experience with gas company as line inspector, having worked during period of laying the line. Has been boss in lumber camps and held other similar occupations. Address Box B-133, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Salesman and engineer, now employed, wishes to make change. Age 36, college graduate in mechanical engineering. Applicant has had 12 years experience in selling and supervision in the natural gas industry. Would like to connect with company interested in gas development or public utility. Experience record and references can be furnished. Address Box E-147, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Experienced town plant manager desires position. Can handle commercial and industrial jobs or act as sales manager. Understands fully the distribution and sale of natural gas, and has good record. Address Box E-135, *Western Gas,* 124 West Fourth St., Los Angeles, Calif.

## Minneapolis Gas Light Co. Reduces Suburban Rates

Minneapolis Gas Light Co., Minneapolis, Minn., through its subsidiary, the Minneapolis Suburban Gas Co., has announced a reduction in gas rates for house heating, amounting to 10 cents per 1,000 cubic feet, at Hopkins, St. Louis Park, and other suburban communities. John K. Swanson, vice-president and general manager of the parent company, estimates that a considerable saving will be effected yearly for the average consumer.

## Installs Odorizing Equipment At Sheridan, Wyoming

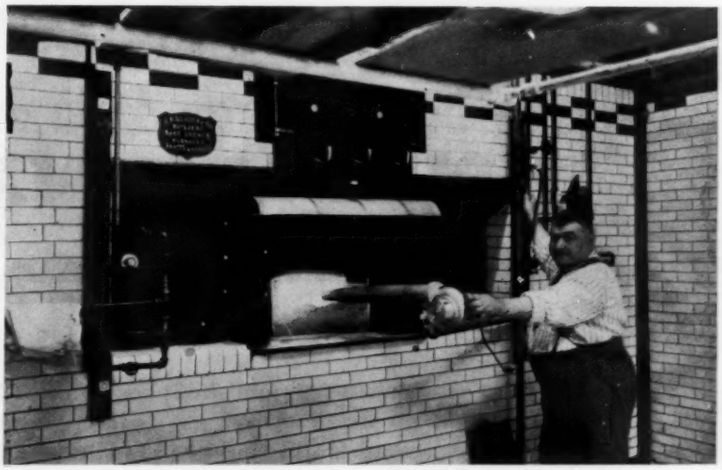
Northwest States Utilities Co., subsidiary of Minnesota Northern Power Co., Minneapolis, Minn., has completed the installation of odorizing equipment at Sheridan, Wyo. A line was completed to that town from the Billy Creek field in 1930.

## Ohio Oil Co. Brings in 10,000,000 cu. ft. Well in Mexico

Ohio Oil Co., maintaining general headquarters in Findlay, Ohio, and operating in Western United States, recently brought in a 10,000,000 cubic foot gas well in Mexico, south of the international border. The new well is near the route of the United Gas Co.'s line from Roma to Monterrey.

## E. P. Bailey General Manager National Radiator Corp.

National Radiator Corp., Johnstown, Pa., announces the appointment, effective June 1, of Edward P. Bailey, Jr., as general manager of the gas heating division, Johnstown, Pa.



*4 ovens in one of San Francisco's famous bakeries (the "New Parisian," owned by Larrabaru Brothers) are fired with the Type "G" Burners. Results show substantial savings in fuel costs. Time required to bring the oven to baking temperature has been materially reduced. Uniform distribution of heat with even penetration is producing finest French bread. Illustration to the left shows full view of the burner.*

# N. G. E. Type "G" GAS BURNERS

## for direct fired bake ovens of the "Dutch Oven" Type

Major advantages of this advanced type of burner are as follows: May be used for all kinds of baking, from hearth bread to pastry; baking can be done immediately after firing; uniform heat distribution eliminates waiting to "soak" heat; cast aluminum burner assembly eliminates excessive weight; facilitates handling; all parts standardized and interchangeable; burner furnished complete from dial gas valve to pilot lighter; maximum return on investment is insured by high efficiency, reasonable first cost, long life and freedom from upkeep expense.

Used and endorsed by leading bakeries and backed by the mature experience and thorough engineering and research that have made N. G. E. Gas Burners internationally famous. Operators of boiler plants and other gas fuel users are invited to utilize the services of N. G. E. engineers to select the type of burner best adapted to conditions in individual plants. Ask for new burner literature.

**NATURAL GAS EQUIPMENT, INC.**

LOS ANGELES, Petroleum Securities Bldg. SAN FRANCISCO, 1123 Harrison Street

Pacific Coast Distributors for Webster Engineering Co., Tulsa; Surface Combustion Co., Toledo

**LOOK TO THE PIONEERS FOR CONTINUED LEADERSHIP**

# GAS
## PIPE LINE MAP

**Compiled by the Editors of WESTERN GAS**
**Size 45" x 45"**

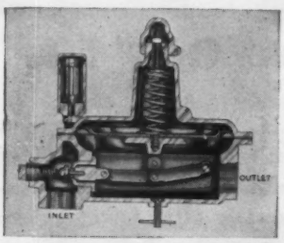
**The most comprehensive published; covers the 22 western states in detail. Gives gas fields, names of natural gas communities; sizes of pipe lines and names of pipe line companies**

**Prices, $1.50, Heavy Bond Paper; $3.50, Printed on Cloth**

**WESTERN GAS**

**124 West Fourth St.** **Los Angeles, Calif.**






## Reynolds Products—

Products for all kinds of Pressure Reduction—for either artificial or natural gas.

GOVERNORS — Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.

REGULATORS — High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.

VALVE—Automatic, Quick-Closing Anti-Vacuum, Relief.

REYNOLDS GAS CONTROL SINCE 1892

**Reynolds Gas Regulator Co.**
Anderson, Indiana
422 Dwight Building—Kansas City, Missouri
Second Unit Santa Fe Building—Dallas, Texas



**Gentlemen:**
**Kindly send me a sample can and full details regarding**

# A-B Vit

## The New Porcelain Enamel Cleaner

Name.....

Company.....

Address.....

**No obligation, of course**
**Clip and mail today to**

**A-B STOVE CO., Battle Creek, Mich.**


### Bulletin on the Surface Decarburization of Steel

There is now available the bulletin covering the results of two years' work at the University of Michigan, Department of Engineering Research, on "The Surface Decarburization of Steel at Heat Treating Temperatures." This work, which was sponsored by the Committee on Industrial Gas Research of the American Gas Association, was an investigation of the causes and possible cure of this troublesome condition.

The research upon which this bulletin is based was initiated at the University of Michigan by the Committee on Industrial Gas Research of the American Gas Association in August, 1928.

Results obtained from the studies of the decarburization effect of pure gases and synthetic mixtures are given in detail and finally summarized in 14 sections. Recommendations for the prevention or elimination of surface decarburization are given. The bulletin will no doubt prove of value to the metallurgists of plants using industrial gas. Copies can be secured at American Gas Association headquarters, 420 Lexington Avenue, New York City.

### United Gas Public Service Co. Liquidates Dixie Gas and Fuel

The United Gas Public Service Co. is liquidating its subsidiary, Dixie Gas and Fuel Co., and is taking over that company's franchises, contracts and physical properties, it was announced early in June.

There will be no change in the personnel or management. All of the former employees of the Dixie Gas and Fuel Co. will retain their relative positions with United Gas Public Service Co., which is the principal operating subsidiary of the United Gas Corp.

The Dixie Gas and Fuel Co. distributes natural gas in the following towns: Cleveland, Crosby, Dayton, Highlands, Humble, Liberty, Mt. Belvieu, Jonesville, Beaumont, Goodrich, Livingston, Lufkin, Orange, Sour Lake, Carthage, Garrison, Hallsville, Henderson, Jacksonville, Kilgore, Lindale, Longview, Marshall, Nacogdoches, Overton, Rusk, Scottsville, Swan, Timpson, Troup and Waskom.

### Consolidate Sales Offices; Begin Advertising Campaign

The sales plan of the Milwaukee Gas Specialty Co., Milwaukee, Wis., and its subsidiary, the Claus Manufacturing Co., is being changed so as to make provision for selling the products of both companies from the offices of the Milwaukee Gas Specialty Co.

Instead of maintaining two sales offices, the companies will maintain only one at the Milwaukee Gas Specialty Co. headquarters. The change becomes effective at once.

The organization is launching an advertising campaign featuring its oven heat control, which is known as "Thermolator." This campaign includes space in the nationally circulated magazines as well as in three gas trade journals, and will extend over a period of one year.

### Paul W. Ernst with Phoenix Utility Co., Butte, Mont.

Paul W. Ernst, auditor of the Great Falls Gas Co., has taken a position with the Phoenix Utility Co., at Butte, Mont. He is succeeded by A. E. Pohlod of Great Falls.

### D. J. Quammen, Mgr. Philadelphia District for Cutler-Hammer, Inc.

D. J. Quammen has been appointed manager of the Philadelphia district office of Cutler-Hammer, Inc., Milwaukee, Wis., manufacturer of electric motor control and allied apparatus. Mr. Quammen succeeds F. J. Burd, who has been made assistant manager of the Chicago office of Cutler-Hammer. Mr. Burd will have charge of industrial sales in the Chicago district, and of the C-H paper machine drive, throughout the country.

Mr. Quammen has been connected with the Philadelphia office of Cutler-Hammer for the past 5 years as a sales engineer. He is a graduate of the University of Wisconsin, Class of '24, with a degree of B. S. in mechanical engineering.

### Columbia University Course In Household Equipment

The American Gas Association for 4 years has cooperated with Columbia University in offering a three weeks course in gas equipment, and it will take place this year July 6-24, as a part of the university's summer session. Students enrolled may take the course without examination, and without credit. College matriculants may receive college credit by registering as regular students and passing the final examination.

The morning lectures are conducted by Dr. C. J. Lynde, head of the household equipment department, assisted in the laboratory work by T. H. Schleuning, test engineer of the Consolidated Gas Co., New York.

The afternoon work is optional, programs being planned by the American Gas Association home service committee for six after noons, which include visits to various home service departments around New York.

### Pacific Pipe and Supply Co.'s Bulletin on Odorization

The Pacific Pipe and Supply Co. has recently published a leaflet covering the application of Papico natural gas odorization equipment. This mechanism utilizes differential pressures obtained across an orifice disc. The pressures thus obtained operate automatically to control the amount of odorant diffused into the gas transmission line. Several views of actual installations appear in this leaflet along with an interesting graph showing actual results obtained under various odorant concentrations. Copies may be obtained by writing to the Pacific Pipe and Supply Co., 1002 Santa Fe Avenue, Los Angeles, Calif.

### Southern Union Begins Work on Las Vegas System

Work has started on construction of the distribution system at Las Vegas, N. M., by Southern Union Gas Co., headquartered at Dallas, Texas. The company is constructing a natural gas transmission line from the Albuquerque-Santa Fe line to serve the town of Las Vegas, and expects to have the lateral complete and service inaugurated by September 1.

### Fordemwalt Now Manager of Creston Gas and Electric Co.

B. M. Fordemwalt has been named manager of the Creston Gas and Electric Co., Creston, Iowa, taking the place of R. E. Williams, resigned. Mr. Fordemwalt was formerly with affiliated interests at Fairfield, Iowa.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*Resists Acids*
*and Boiling Water*

Now Used in All

**Sprague Meters and Regulators**

May we send you samples and data

**The Sprague Meter Co.**

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Multiple Jet Gas Burners
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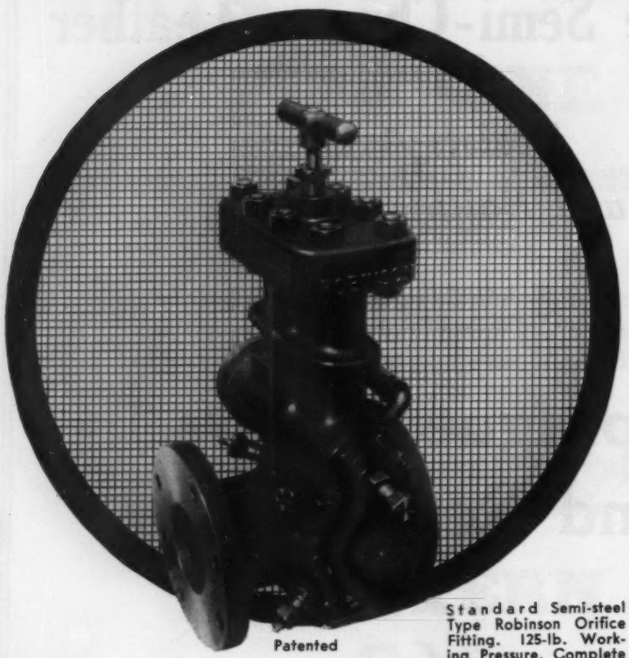

Patented

Standard Semi-steel Type Robinson Orifice Fitting. 125-lb. Working Pressure. Complete line includes all practical sizes and working pressures.

# Guarding your meters against inaccuracy....

Metering accuracy begins in the orifice fitting. The graphic story told by the meter is merely relayed from the inside of the pipe where the actual facts about the flow are secured. For this reason, orifice plates must be easily accessible for inspection and must at all times be in a true central position.

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*Introducing our latest achievement in the new "Senorita" models*

# The SPARK Console Model

## *Lid-Top Gas Stove*

A beautiful new stove on modern lines, with all the characteristic advantages of Spark construction . . . Marbled color effects on an ivory background . . . Extra thick, reinforced oven insulation . . . Porcelain lid-top . . . Concealed, aerated manifold (Pat. Applied for) . . . Pendant style oven and valve handles.

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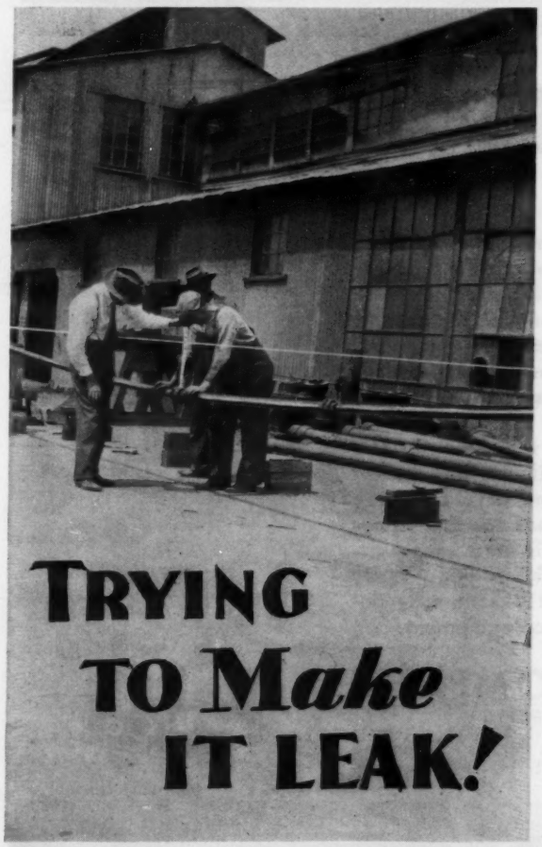


# THE TESTS TELL

Test after test on McWANE-PACIFIC Cast Iron Gas Pipe and Joints result the same way—no leaks. Here's a 30-foot section of 2-inch McWane-Pacific Pipe being deflected 2 feet without a quiver of the gauge-needle.

Put McWANE-PACIFIC pipe underground in *your* high pressure mains and get the same results. For natural gas, or manufactured. McWane-Pacific pipe cannot rust. It needs no coating or coddling. Swift and simple to lay.

## A Joint for Every Pressure

McWane Joint types are: Recess-threaded and Flexpan for high pressure; Bell & Spigot for low. Also Plain ends and special designs if desired. Address nearest office for details.

**PIPE SIZES: 1¼ THRU 12 INCHES**

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**PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH**

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# Wedgewood Dealers are making early gas heating preparations

WEDGEWOOD

## CONSOLE GAS CIRCULATORS

Will play an outstanding part in home heating this fall and winter. The first cold blast will bring a deluge of orders for Wedgewood Console Gas Circulators to dealers who are prepared to make quick installations. Those who go after this business early will avoid the last minute rush.

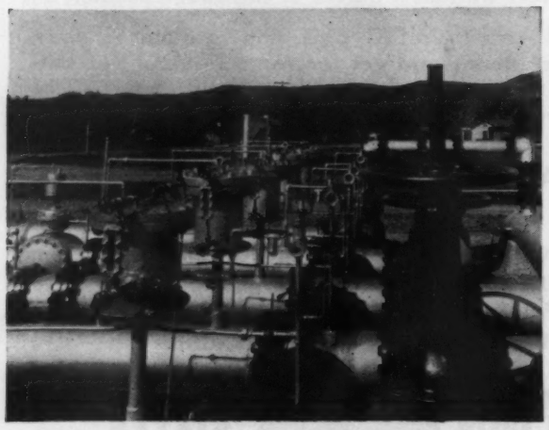
Note These Features:

- Welded gas tight and vented!
- Visible flame!
- Lights automatically with gas pilot!
- No radiants to break or burn out!
- Can be vented in fireplace!
- Beautiful two-tone walnut porcelain console cabinet!
- Large amount of radiating surface of heating element!

Another Wedgewood Super-Value
Made in Two Sizes
A.G.A. Approved for Natural or Manufactured Gas

JAMES GRAHAM MANUFACTURING CO.
Largest Stove Manufacturers in the West
The all-inclusive Gas Line
San Francisco Newark, Calif. Los Angeles

# CORRECT ODORIZATION



## NOW OBTAINABLE AT A SAVING

Experimenting with unproven natural gas odorization equipment is costly and generally does not accomplish the desired results. Papico Odorization Equipment can be obtained at consistent cost and will solve, for all time, your problem of correct gas treatment. The Southern California gas distributing systems have been the proving-grounds for this equipment and it is used almost exclusively in this region. Write for our latest Bulletin fully describing Papico equipment.

## PACIFIC PIPE & SUPPLY COMPANY

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Manufacturers of: Natural Gas Odorization Equipment - Orifice Disc Fittings - Calibrated Meter Runs - Indirect Water Heaters - Perfection Duplex Mercury Traps - Pipe Bending, Coiling and Van Stoning.

PAPICO

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Wholly-owned subsidiary of
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CONSULTING NATURAL GAS ENGINEERS
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DOUBLEX SIMPLEX
CAST IRON PIPE
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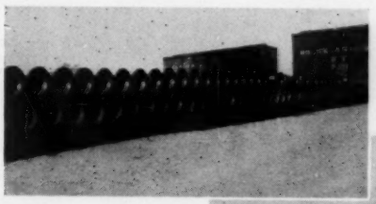
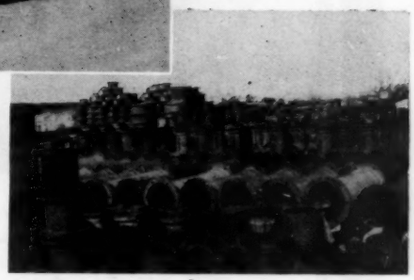
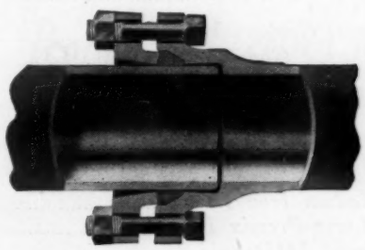


"*and* Please Rush It!"



(Above) Doublex-Simplex Pipe on the way to the line. (Right) Doublex-Simplex Fittings.

WE get lots of orders like that . . . "must have pipe on location within 10 days; *rush it!*" And so we gear our production and distribution systems to fill rush orders promptly. Not only in Birmingham but also at strategic points throughout the United States we maintain large stocks of pipe and fittings. Our foundry is the largest individual cast iron pipe foundry in the United States. We are now furnishing Doublex-Simplex pipe in 16-foot lengths, in diameters from 4" to 24" inclusive. It is a high-pressure cast iron pipe, made by the well-known Mono-Cast centrifugal method, equipped with the Doublex-Simplex Joint (see cross-section diagram) which withstands extreme pressures and remains permanently bottle-tight while allowing maximum deflection in the line. Quickly, easily, economically laid. Write or wire nearest Acipco office for comprehensive catalog describing Doublex-Simplex pipe in detail. It's free.



DOUBLEX-SIMPLEX JOINT withstands high pressures and remains bottle-tight under repeated deflections

AMERICAN
CAST IRON PIPE COMPANY
BIRMINGHAM, ALABAMA

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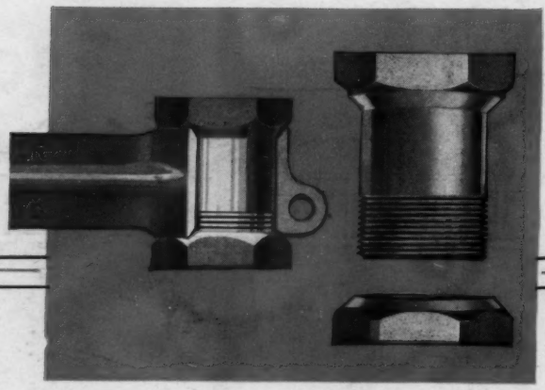

An enlarged and cut-away view showing the adjustable bevel cylinder principle.

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# Fewer Connections
## *on*
# *New MUELLER Meter Hanger*

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G-11214 End inlet, Vertical adjustable cylinder outlet.

| | Inlet | Outlet Swivel | Tapping |
|---|---|---|---|
| 5 light ..... | ¾" | ¾" | ½" |
| 10 light ..... | 1" | 1" | ¾" |

G-11239 Vertical adjustable cylinder inlet and outlet.

| | Inlet | Outlet Swivel | Tapping |
|---|---|---|---|
| 5 light ..... | ¾" | ¾" | ½" |
| 5 light ..... | 1 " | 1 " | ½" |
| 5 light ..... | 1 " | 1 " | ¾" |
| 10 light ..... | 1 " | 1 " | ¾" |
| 20 light ..... | 1¼" | 1¼" | 1 " |
| 30 light ..... | 1½" | 1½" | 1¼" |

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